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**Master Negative
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PSt SNPaAg018

CONTENTS OF REEL 18

- 1) Quarterly report of the Pennsylvania Board of Agriculture,
no. 41-42
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- 2) Quarterly report of the Pennsylvania Board of Agriculture,
no. 43
MNS# PSt SNP aAg018.2**
- 3) Quarterly report of the Pennsylvania Board of Agriculture,
no. 44
MNS# PSt SNP aAg018.3**
- 4) Quarterly report of the Pennsylvania Board of Agriculture,
no. 45-46
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CONTENTS OF REEL 18 (CONTINUED)

- 5) Quarterly report of the Pennsylvania Board of Agriculture,
no. 47
MNS# PSt SNPAG018.5
- 6) Quarterly report of the Pennsylvania Board of Agriculture,
no. 51
MNS# PSt SNPAG018.6
- 7) Quarterly report of the Pennsylvania Board of Agriculture,
no. 53
MNS# PSt SNPAG018.7

**Title: Quarterly report of the Pennsylvania Board of
Agriculture, no. 41-42**

Place of Publication: Harrisburg, Pa.

Copyright Date: 1890

Master Negative Storage Number: MNS# PSt SNP aAg018.1

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 \$cPennsylvania Board of Agriculture
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 362 0 1878-1894
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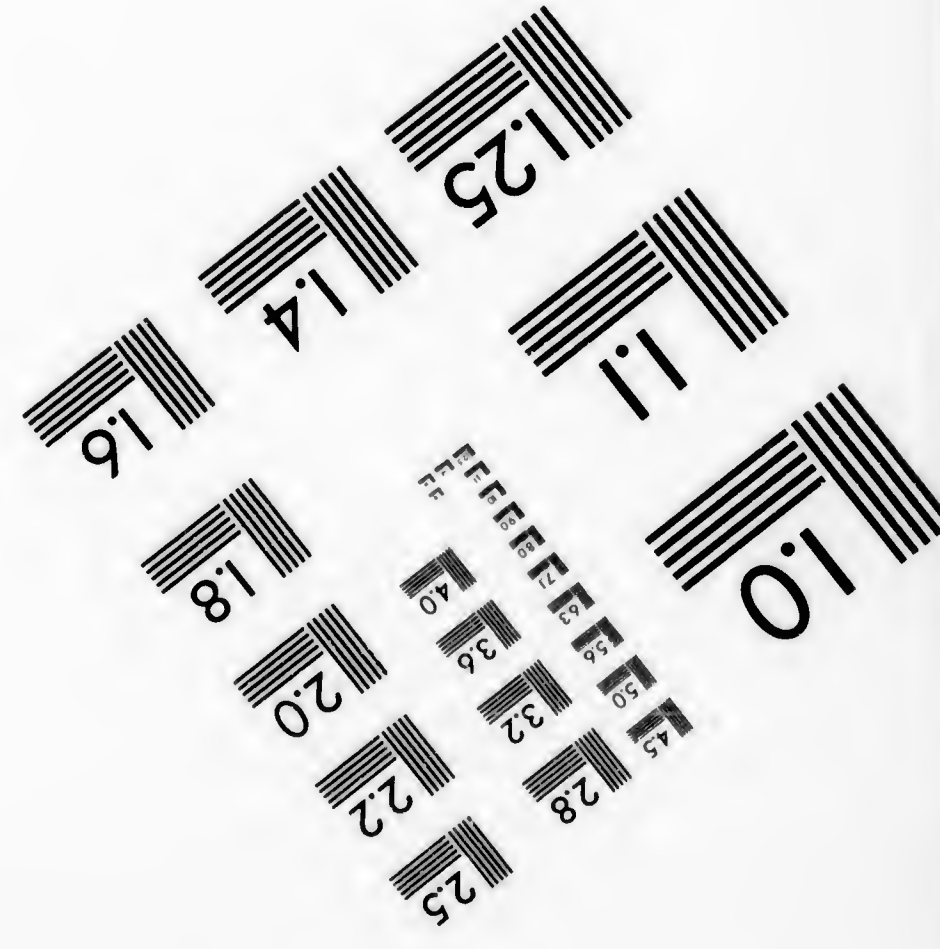
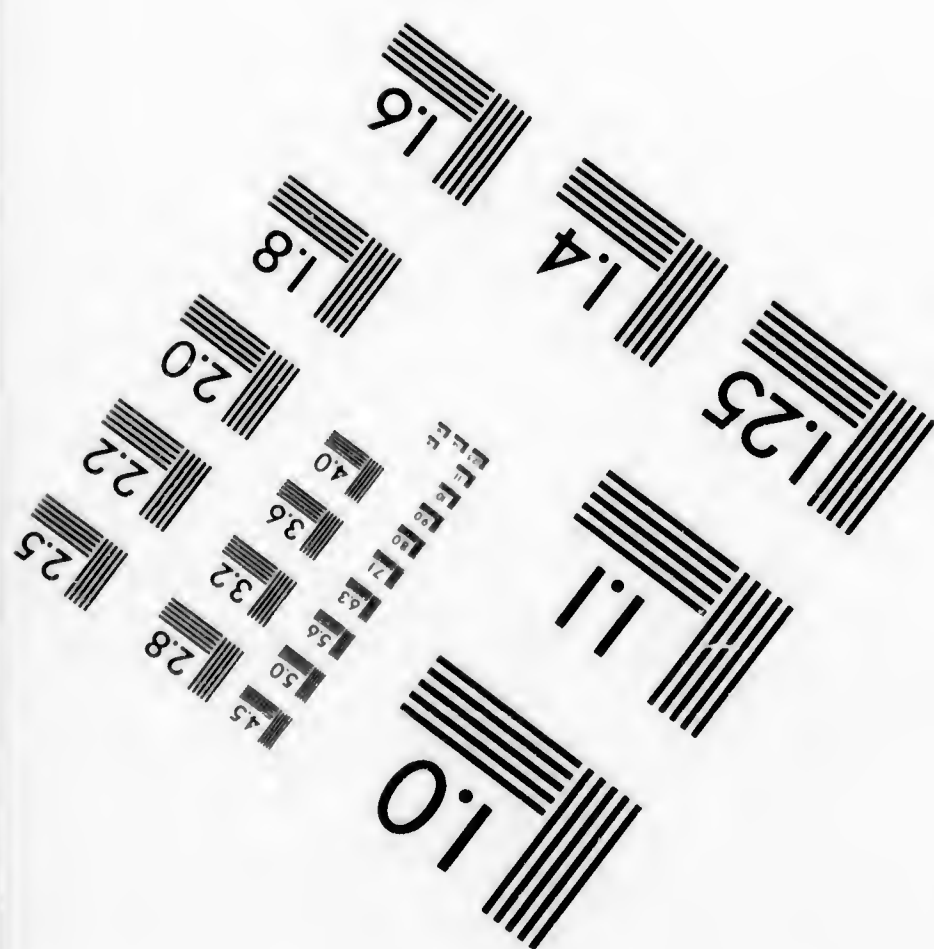
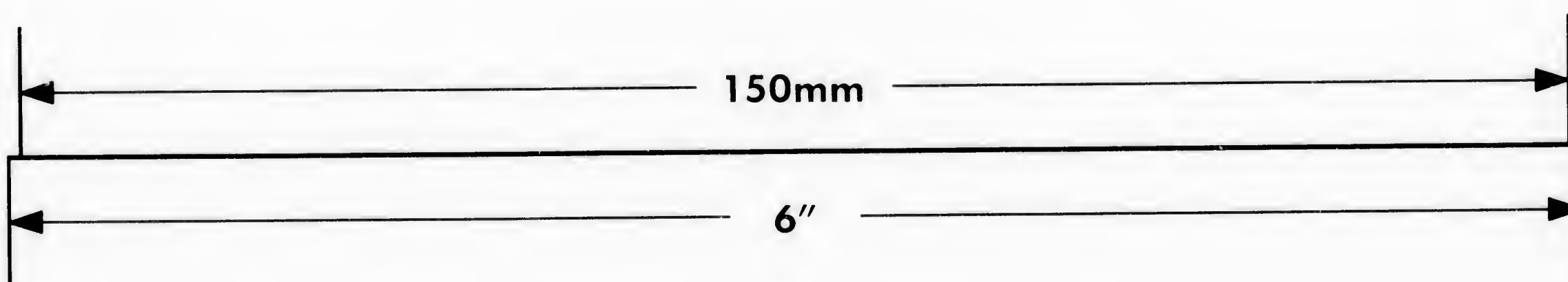
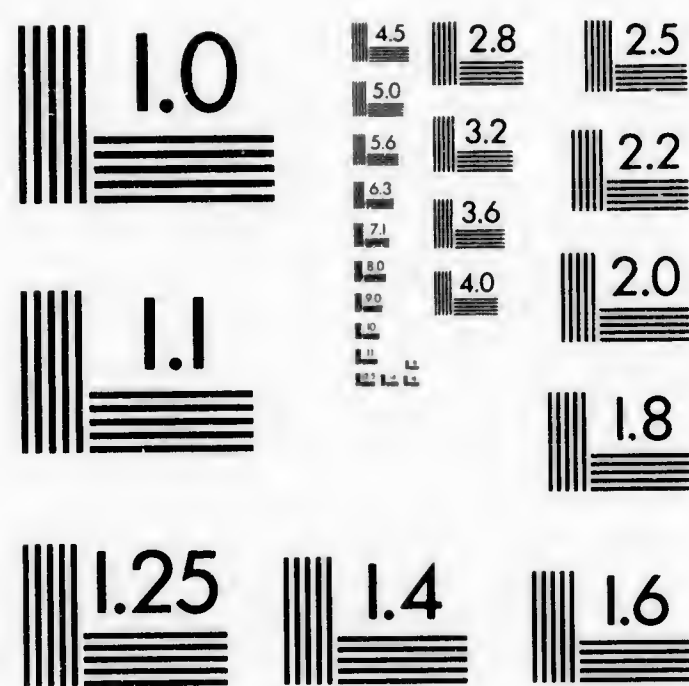
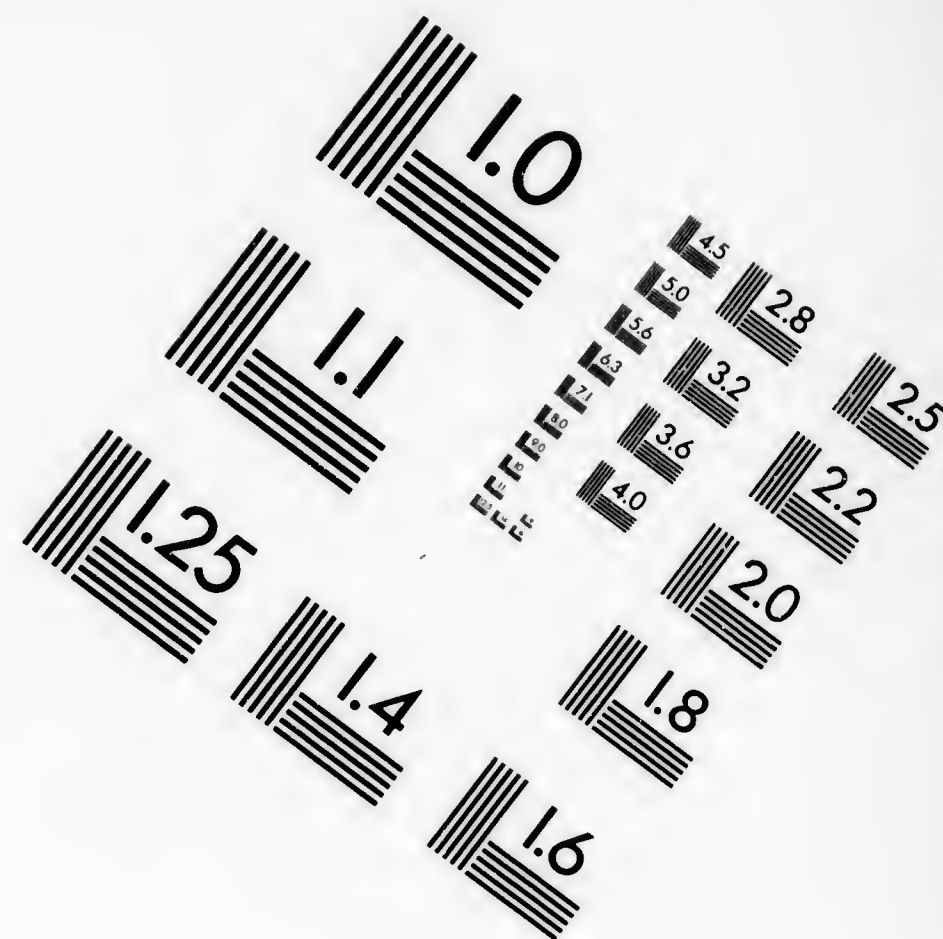
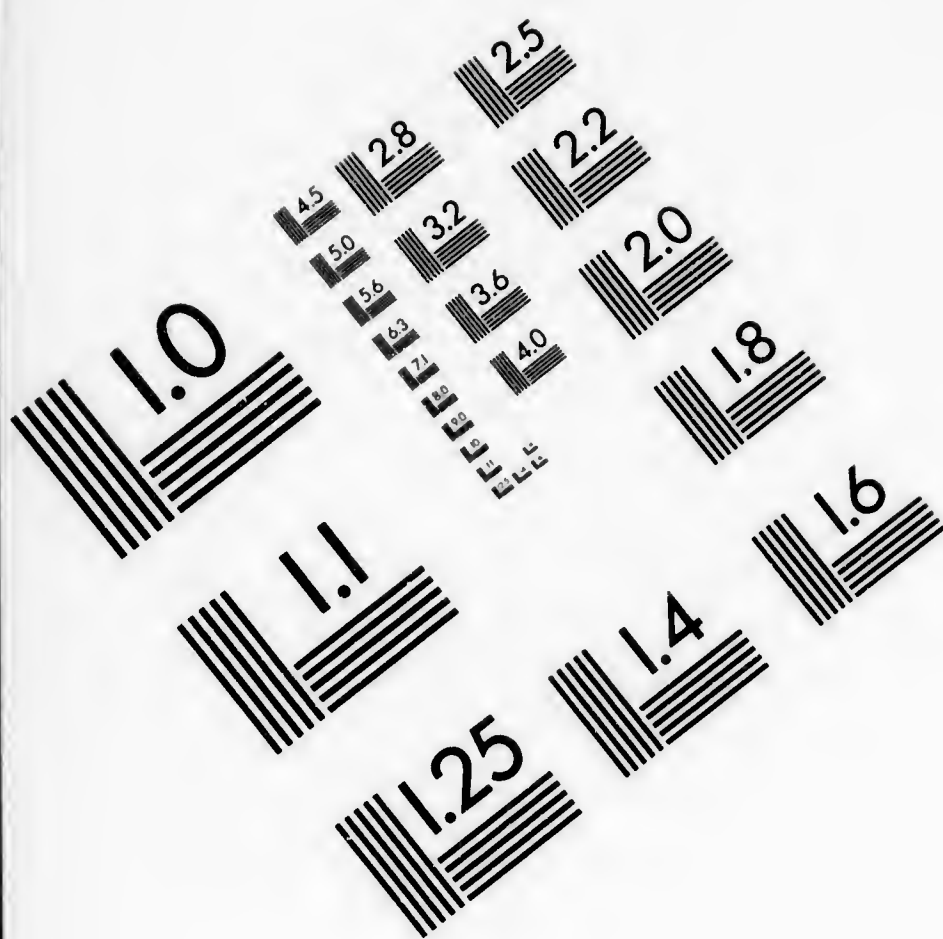
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Forty-first and Forty-second

QUARTERLY REPORTS

— OF THE —

PENNSYLVANIA

Board of Agriculture.



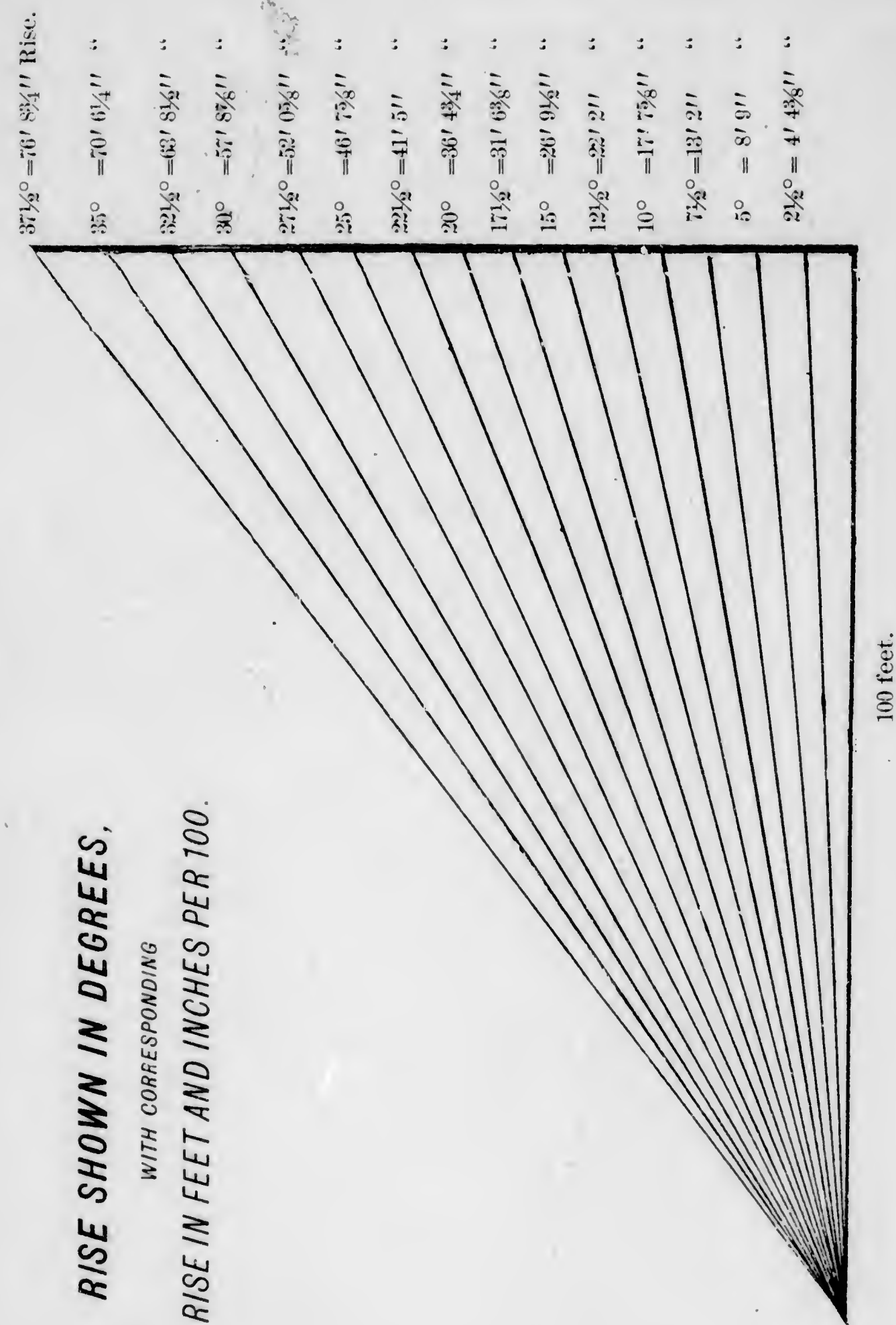
Roads and Road Laws.

Road Construction and Road Repairs.

1890.

HARRISBURG:
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1890.

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Compliments of
Penna. State Board of Agriculture.
Thomas J. Edge, Secretary.
Please acknowledge receipt.

FOR THE YEAR 1890.

Members Ex-Officio.

Hon. James A. Beaver, Governor.
Hon. Thos. J. Stewart, Secretary of Internal Affairs.
D. J. Waller, Jr., Superintendent of Public Instruction.
Hon. Thomas McCamant, Auditor General.
Dr. Geo. W. Atherton, President Pennsylvania State College.

Appointed by the Governor.

Col. James Young, Middletown, Dauphin county, Pa.	Term expires.
S. R. Downing, West Chester, Chester county, Pa.	1891
Will B. Powell, Springboro, Crawford county, Pa.	1892
	1893

Elected by County Agricultural Societies.

		Term expires.	
Adams	I. Garretson	Bigler	1891
Armstrong	N. Senor	Plumville	1893
Beaver	A. L. McKibben	Green Garden	1893
Bedford	S. S. Diehl	Bedford	1891
Berks	G. D. Stitzel	Reading	1892
Bucks	E. Reeder	New Hope	1893
Butler	W. H. H. Riddle	Butler	1891
Bradford	Robt. H. Laning	Towanda	1892
Blair	Fred. Jackel	Hollidaysburg	1892
Clarion	W. Shanafelt	Brinkerton	1892
Chester	Thos. J. Edge	Harrisburg	1893
Centre	Dr. E. W. Hale	Bellefonte	1891
Clinton	J. A. Herr	Cedar Springs	1893
Columbia	Chandlee Eves	Millville	1891
Crawford	J. B. Phelps	Conneautville	1892
Cumberland	C. H. Mullin	Mt. Holly Springs	1891
Dauphin	G. Hiester	Harrisburg	1891
Eric	J. C. Thornton	Avonia	1892
Indiana	W. C. Gordon	Black Lick	1892
Jefferson	J. McCracken, Jr.	Frostburg	1893
Juniata	David Wilson	Port Royal	1891
Lackawanna	H. H. Colvin	Dalton	1891
Lancaster	Calvin Cooper	Bird-in-Hand	1892
Lawrence	Sam'l McCreary	Neshannock Falls	1891
Lebanon	C. R. Lantz	Lebanon	1891
Lehigh	Dr. J. P. Barnes	Allentown	1891
Luzerne	J. B. Smith	Kingston	1893
Lycoming	P. Reeder	Hughesville	1891
Mercer	Robert McKee	Mercer	1893
Montgomery	H. W. Kratz	Trappe	1893
Montour	J. K. Murray	Potts' Grove	1892
Northampton	A. D. Shimer	Bethlehem	1891
Northumberland	John Hoffa	Milton	1893
Perry	F. M. McKeehan	Ferguson	1891
Schuylkill	J. T. Shoener	Orwigsburg	1892
Somerset	N. B. Critchfield	Jenner's X Roads	1892
Sullivan	J. H. Lawrence	Dushore	1891
Susquehanna	R. S. Searle	Montrose	1892
Tioga	J. W. Mather	Wellsboro'	1892
Union	J. A. Gundy	Lewisburg	1893
Venango	A. Frazier	Cooperstown	1892
Warren	Chas. Lott	North Warren	1892
Washington	John McDowell	Washington	1893
Wayne	N. F. Underwood	Lake Como	1892
Westmoreland	F. Y. Clopper	Greensburg	1892
Wyoming	N. G. Bunnell	Vosburg	1892
York	Dr. W. S. Roland	York	1892

41st AND 42d QUARTERLY REPORTS OF THE PENNSYLVANIA STATE BOARD OF AGRICULTURE FOR THE YEAR 1890.

Members Ex-Officio.

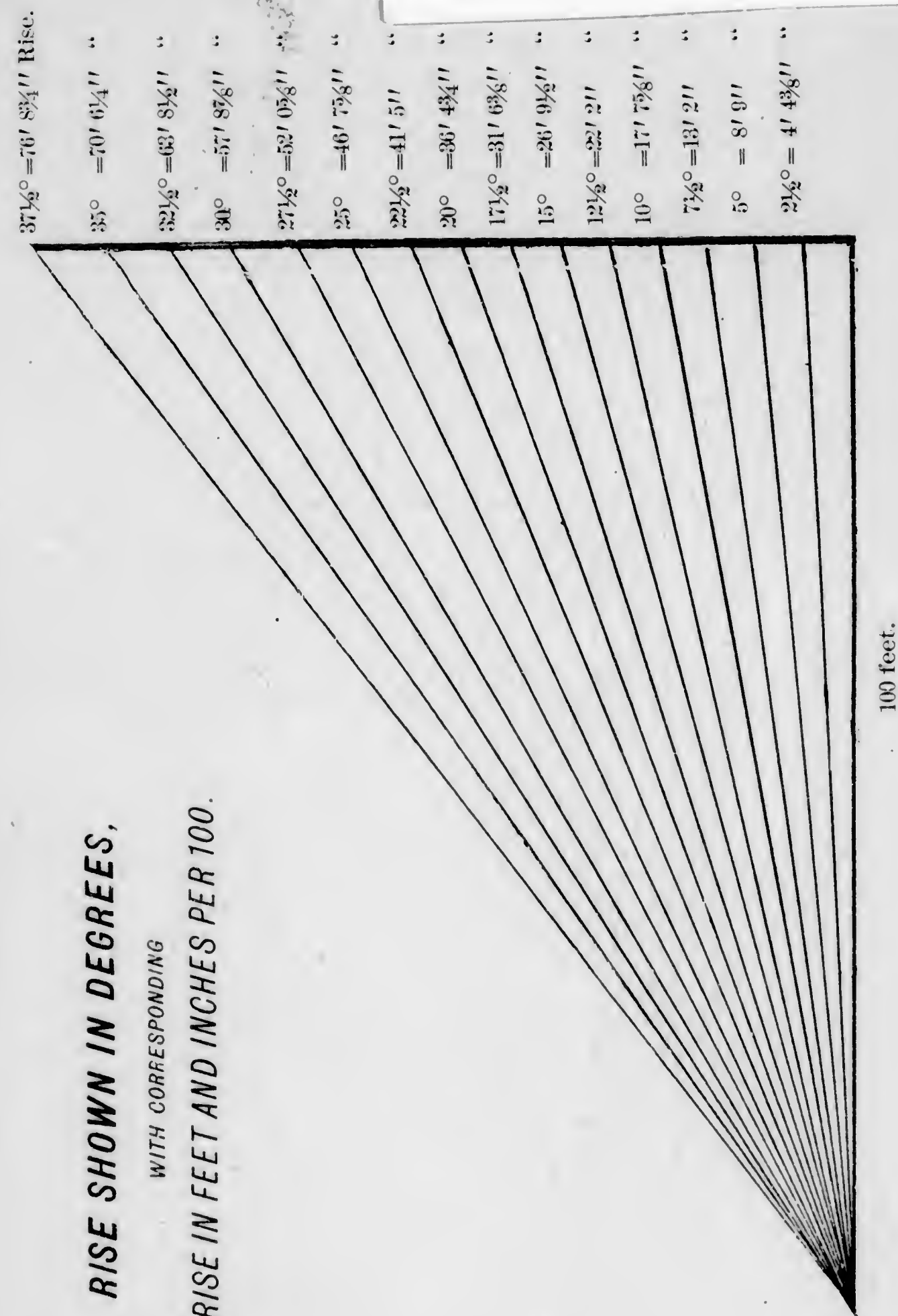
Hon. James A. Beaver, *Governor*.
Hon. Thos. J. Stewart, *Secretary of Internal Affairs*.
D. J. Waller, Jr., *Superintendent of Public Instruction*.
Hon. Thomas McCamant, *Auditor General*.
Dr. Geo. W. Atherton, *President Pennsylvania State College*.

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Will B. Powell, Springboro', Crawford county, Pa.	1893

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Lancaster	Calvin Cooper	1892
Lawrence	Sam'l McCreary	1891
Lebanon	C. R. Lantz	1891
Lehigh	Dr. J. P. Barnes	1891
Luzerne	J. B. Smith	1893
Lycoming	P. Reeder	1891
Mercer	Robert McKee	1893
Montgomery	H. W. Kratz	1893
Montour	J. K. Murray	1892
Northampton	A. D. Shimer	1891
Northumberland	John Hoffa	1893
Perry	F. M. McKeenan	1891
Schuylkill	J. T. Shoener	1892
Somerset	N. B. Critchfield	1892
Sullivan	J. H. Lawrence	1891
Susquehanna	R. S. Searle	1892
Tioga	J. W. Mather	1892
Union	J. A. Gundy	1893
Venango	A. Frazier	1892
Warren	Chas. Lott	1892
Washington	John McDowell	1893
Wayne	N. F. Underwood	1892
Westmoreland	F. Y. Clopper	1892
Wyoming	N. G. Bunnell	1892
York	Dr. W. S. Roland	1892
	Bigler	1891
	Plumville	1893
	Green Garden	1893
	Bedford	1891
	Reading	1892
	New Hope	1893
	Butler	1891
	Towanda	1892
	Holidaysburg	1892
	Brinkerton	1892
	Harrisburg	1893
	Belleville	1891
	Cedar Springs	1893
	Millville	1891
	Conneautville	1892
	Mt. Holly Springs	1891
	Harrisburg	1891
	Avonia	1892
	Black Lick	1892
	Frostburg	1893
	Port Royal	1891
	Dalton	1891
	Bird-in-Hand	1892
	Neshannock Falls	1891
	Lebanon	1891
	Allentown	1891
	Kingston	1893
	Hughesville	1891
	Mercer	1893
	Trappe	1893
	Potts' Grove	1892
	Bethlehem	1891
	Milton	1893
	Ferguson	1891
	Orwigsburg	1892
	Jenners' X Roads	1892
	Dushore	1891
	Montrose	1892
	Wellsboro'	1892
	Lewisburg	1893
	Cooperstown	1892
	North Warren	1892
	Washington	1893
	Lake Como	1892
	Greensburg	1892
	Vosburg	1892
	York	1892



OFFICIAL LIST.

*President.*Hon. James A. Beaver (*ex-officio*).*Vice Presidents.*

John McDowell, N. F. Underwood, Eastburn Reeder.

*Executive Committee.*Hon. James A. Beaver, G. D. Stitzel, C. Cooper,
J. A. Herr, J. W. Mather, S. McCreary,
R. S. Searle, Dr. W. S. Roland, Thos. J. Edge (*ex officio*).*Advisory Committee.*G. D. Stitzel, Dr. W. S. Roland, Calvin Cooper,
Thos. J. Edge (*ex-officio*).*Secretary.*

Thos. J. Edge, Harrisburg.

Botanist.

Thos. Meehan, Germantown.

Pomologist.

Cyrus T. Fox, Reading.

Chemist.

Dr. Wm. Frear, State College.

Consulting Veterinary Surgeon.

Dr. R. S. Huidekoper, Philadelphia.

Veterinary Surgeon.

Dr. F. Bridge, West Philadelphia.

Microscopists and Hygienists.

Dr. H. Leffmann, Philadelphia, Prof. C. B. Cochran, West Chester.

*Entomologist.**Ornithologist.*

Dr. B. H. Warren, West Chester.

Meteorologists.

J. L. Heacock, Esq., Quakertown. Maj. Frank Ridgway, Harrisburg.

Apiarist.

Prof. G. G. Groff, Lewisburg.

Mineralogist.

Joseph Wilcox, Philadelphia.

Geologist.

Prof. J. P. Lesley, Philadelphia.

Stenographer.

H. C. Demming, Harrisburg.

STANDING COMMITTEES—1890.

LEGISLATION.

J. W. Mather, *Chairman*, H. W. Kratz, W. H. H. Riddle,
G. Hiester, G. W. Atherton, John McDowell,
Joel A. Herr, R. S. Searle, J. A. Gundy,
G. D. Stitzel, I. Garretson, Thos. J. Edge.

FORESTS AND FORESTRY.

Dr. W. S. Roland, *Chair'n*, Dr. H. Leffmann, W. H. H. Riddle,
Thomas Meehan, Frederick Jaekel, J. W. Mather,
C. R. Lantz, W. Shanafelt, G. D. Stitzel,
S. McCreary, F. Y. Clopper, W. C. Gordon.

CEREALS.

G. D. Steitzel, *Chairman*, I. Garretson, E. Reeder,
James Young, A. D. Shimer, John Hoffa,
G. Hiester, J. A. Gundy, F. M. McKeehan.

BIRDS AND MAMMALS.

Dr. B. H. Warren, *Chairman*, N. B. Critchfield, J. A. Gundy,
G. B. Sennett, R. S. Searle, J. W. Mather,
J. B. Phelps, C. Cooper, N. F. Underwood.

DAIRY AND DAIRY PRODUCTS.

E. Reeder, *Chairman*, N. F. Underwood, M. W. Oliver,
J. A. Herr, I. Garretson, Dr. H. Leffmann,
Chandlee Eves, N. B. Critchfield, Prof. C. B. Cochran.

FRUIT AND FRUIT CULTURE.

C. Cooper, *Chairman*, Chas. Lott, C. T. Fox,
G. D. Stitzel, J. H. Bartram, H. S. Rupp,
J. Hoffa, J. E. Jamison, W. H. Moon,
J. A. Herr, G. Hiester, Dr. J. Calder.

SORGHUM AND SUGAR CROPS.

R. S. Searle, *Chairman*, Chandlee Eves, John Hoffa,
Joel A. Herr, W. B. Powell, J. C. Thornton,
I. Garretson, N. G. Bunnell, H. H. Colvin.

APIARY.

F. M. McKeehan, *Chairman*, N. F. Underwood, M. W. Oliver,
David Wilson, John Hoffa, Dr. S. W. Morrison,
G. D. Stitzel, N. B. Critchfield, J. B. Cox,
J. A. Gundy, W. Shanafelt, Dr. G. G. Groff.

TEXTILE FIBERS.

J. McDowell, *Chairman*, George Wray, W. G. Berry,
J. C. McNary, J. Woodburn, J. W. Mather,
W. A. Herriott, D. M. Campsey, I. Garretson.

ENSILAGE AND FODDER CROPS.

J. B. Phelps, *Chairman*, G. D. Stitzel, W. B. Powell,
J. McCracken, Jr., J. C. Thornton, W. Shanafelt,
Chas. Lott, N. B. Critchfield, Frederick Jaekel.

ROADS AND ROAD LAWS.

S. R. Downing, *Chairman*, H. W. Kratz, F. M. McKeehan,
J. W. Mather, J. A. Gundy, J. A. Herr,
C. Cooper, N. F. Underwood, J. C. Thornton,
J. B. Phelps, J. P. Barnes, A. Frazier.

OBITUARY.

Rev. E. E. HIGBEE, D. D., LL. D.

BORN MARCH 27, 1830.

DIED DECEMBER 13, 1889.

Rev. Elnathan Elisha Higbee, D. D., LL. D., *ex-officio* a member of the State Board of Agriculture, was born in Burlington, Vermont, March 27, 1830. When quite young he entered the University of Vermont, where he distinguished himself in a class of great ability and graduated with honor in 1849.

His first teaching was done in his native state, before he was sixteen years of age. After graduation he resumed the work of teaching in Emmittsburg, Maryland, where he was employed as tutor in the family of Hon. Joshua Motter, whose daughter he afterwards married. He also taught a year as assistant teacher in the high school of Lancaster, Pennsylvania. Soon after he took up his residence at Emmittsburg he entered the Theological Seminary at Mercersburg, and was licensed to preach in May 1854. In 1858 he became the pastor of the First Reformed church in Tiffin, Ohio, and at the same time served as Professor of Languages in Heidelberg College, located at that place.

In 1862 he took charge of Grace church, Pittsburgh, and in 1865 he succeeded Dr. Schaff as Professor of Church History and Exegesis at Mercersburg, and became president of the college in 1867.

He was first appointed State Superintendent of Public Instruction by Governor Hoyt, in April, 1881; he was re-appointed by Governor Pattison in 1885, and by Governor Beaver in 1889.

While attending a teachers' institute in Mifflin, he was stricken with paralysis on Tuesday, December 10, 1889, and on the following Friday he died, never having regained consciousness from the time of his first attack. He was buried at Emmittsburg, Maryland, and a suitable monument will be erected over his remains, the funds needed for this purpose having been contributed by the teachers and school children in whose behalf he had labored so earnestly and efficiently for many years.

He was a remarkable scholar, a born teacher, an eloquent speaker, a faithful public officer and a true friend.

LIST OF LOCAL FARMERS' INSTITUTES.

Held under the auspices of the State Board of Agriculture, and in accordance with the act of May 23, 1889, during the season of 1889-90.

COUNTY.	WHERE HELD.	DATE.	MANAGED BY.
Adams,	Gettysburg,	Jan. 9-10,	I. Garretson.
Adams,	Bendersville,	Feb. 20-21,	I. Garretson.
Armstrong,	Kittanning,	Feb. 6-7,	W. R. Ramaley.
Bedford,	Bedford,	Jan. 24-25,	S. S. Deihl.
Bedford,	Hyndman,	March 19-20,	S. S. Deihl.
Berks,	Hamburg,	March 5-6,	G. D. Stitzel.
Berks,	Reading,	Feb. 1,	G. D. Stitzel.
Berks,	Reading,	March 1,	G. D. Stitzel.
Berks,	Reading,	April 5,	G. D. Stitzel.
Bucks,	Langhorne,	Dec. 10-11,	E. Reeder.
Bucks,	Riegelsville,	Feb. 27-28,	E. Reeder.
Bradford,	Canton,	March 13-14,	C. D. Derrah.
Chester,	Unionville,	Jan. 6-7,	C. F. Wickersham.
Chester,	Atglen,	Feb. 6-7,	D. H. Branson.
Chester,	Oxford,	Feb. 13-14,	T. K. Stubbs.
Centre,	Howard,	Jan. 7-8,	J. A. Woodward.
Centre,	State College,	Jan. 9-10,	H. P. Armsby.
Clinton,	Mill Hall,	Jan. 15-17,	J. A. Herr.
Clinton,	Loganton,	March 20-21,	J. A. Herr.
Columbia,	Benton,	Jan. 8-10,	C. Eves.
Columbia,	Millville,	Jan. 29-31,	C. Eves.
Columbia,	Berwick,	Feb. 25-26,	J. W. Evans.
Crawford,	Linesville,	Dec. 11-12,	J. B. Phelps.
Crawford,	Cambridge,	Feb. 20-21,	J. B. Phelps.
Erie,	Erie,	Feb. 26-27,	J. C. Thornton.
Erie,	Corry,	March 18-19,	J. C. Thornton.
Franklin,	Greencastle,	Dec. 5-6,	G. H. Cook.
Huntingdon,	Warrior's Mark,	Jan. 28-29,	G. W. Musser.
Juniata,	Centre,	Dec. 20-21,	D. B. Esh.
Lancaster,	Black Barren Springs,	Sept. 5-6,	C. Cooper.
Lancaster,	Lancaster,	Jan. 8-9,	C. Cooper.
Lawrence,	New Castle,	Feb. 13-14,	S. McCreary.
Lehigh,	Slatington,	Feb. 14-15,	W. M. Benninger.
Luzerne,	Huntingdon Mills,	Jan. 7-8,	Z. S. Stevens.
Montgomery,	Hatboro',	Jan. 8-9,	W. H. Yerkes, Jr.
Montour,	Danville,	Jan. 28-29,	J. K. Murray.
Northampton,	Bath,	Jan. 30-31,	W. M. Benninger.
Northumberland,	Milton,	Feb. 26-27,	John Hoffa.
Perry,	New Bloomfield,	Jan. 7-9,	F. M. McKeehan.
Somerset,	Somerset,	Feb. 11-12,	N. B. Critchfield.
Somerset,	Jenner's X Roads,	March 29,	N. B. Critchfield.
Susquehanna,	Montrose,	Dec. 19-20,	R. S. Searle.
Susquehanna,	New Milford,	Feb. 26-27,	R. S. Searle.
Susquehanna,	Montrose,	April 29-30,	R. S. Searle.
Tioga,	Wellsboro',	March 13-14,	J. W. Mather.
Union,	Lewisburg,	Jan. 14-15,	J. A. Gundy.
Venango,	Franklin,	Feb. 14-15,	A. Frazier.
Wayne,	Honesdale,	Jan. 15-16,	N. F. Underwood.
Westmoreland,	Mt. Pleasant,	Feb. 13-14,	N. B. Critchfield.
Wyoming,	Tunkhannock,	Feb. 5-6,	N. G. Bunnell.
York,	Stewartstown,	Dec. 26-27,	Dr. W. S. Roland.
York,	York,	Feb. 20-21,	Dr. W. S. Roland.

"It is said that the civilization of a country is marked by its roads. If this be true, Pennsylvania cannot claim to have highest rank in civilization. It is safe to say that no expenditure of public moneys yields so little in return as the road taxes of Pennsylvania. Our entire system of road laws—or rather our road laws which lack system—should be thoroughly revised and codified. They served their purpose when temporary roads were to be laid out and cheaply made through unbroken forests and over lands which had but little value. The time has come when it will be economy, in every way, to build our roads permanently and substantially.

"The comfort of our people, economy in the transportation of our products, saving in the wear and tear of vehicles and animals, and the needless multiplication of highways, all demand that the laws governing the laying out and construction of our roads, should be radically reformed and systematized.

"This may be considered a matter of minor importance, and yet it affects every inhabitant of the commonwealth. We must all use at some time or other, in some way or other, our public roads. Their character and condition affect the breeding of our stock, the style of our vehicles, the carrying capacity of the farmer's wagon, and the speed and enjoyment of all who travel them for business or pleasure, either in the carriage, in the saddle, on the bicycle or on foot.

"A thorough system should be devised and enacted by the legislature which could be put into immediate effect by our older communities, and adopted by those which are newer as their ability and the wants of their people might require."—*Message of Governor James A. Beaver to the General Assembly, January 1, 1889.*

PROCEEDINGS OF THE ANNUAL MEETING,

Held at Harrisburg, Pa., January 22 and 23, 1890.

THURSDAY MORNING, *January 23, 1890.*

ORDER OF BUSINESS.

Addresses and Essays.

1. The Roads and Road Laws. By Hon. James A. Beaver, Governor.
2. The Public Road System of Pennsylvania. By N. F. Underwood, member from Wayne, Lake Como, Pa.
3. The Road Laws of Pennsylvania. By J. A. Gundy, member from Union, Lewisburg, Pa.
4. General discussion, which should be confined to road laws, actual and prospective.

THURSDAY AFTERNOON, *January 23, 1890.*

ORDER OF BUSINESS.

1. The Durability and Economy of McAdam Structures. By Samuel R. Downing, member of the Board, West Chester, Pa.
2. Road Statistics of a Chester County Township. By John I. Carter, Chatham, Pa.
3. Cross-ways and Ditches. By Eastburn Reeder, member from Bucks county, New Hope, Pa.
4. Good Roads a Mutual Advantage to Town and Country. By H. W. Kratz, member from Montgomery, Norristown, Pa.
5. General discussion, which should be confined to road construction and repairs.

THE ROADS AND ROAD LAWS OF PENNSYLVANIA.

The President, Governor Beaver, opened the subject "The Roads and Road Laws of Pennsylvania," as follows:

Gentlemen of the State Board of Agriculture:

In accordance with the programme, it is only necessary that I should bow in the discussion on the subject of roads. I do not expect to consume the time of the Board in any general discussion of the question, because special phases of it have been allotted to different gentlemen who have carefully considered them and will present well digested papers upon them. These, taken together, will constitute a much better consideration of the whole subject than anything which I might say. There is this to be said on the whole question, however, that there is no subject before the people of Pennsylvania upon which there is such a general unanimity as the necessity for reform in the construction of our roads, and as to the laws which regulate our system of laying out and building them.

I have not prepared any remarks for this occasion, and do not intend to occupy the time of the board at any length. It may be said, however, that the present season has demonstrated, if it had never been demonstrated before, that the roads of Pennsylvania are in a most deplorable condition. From every part of the Commonwealth, from all the interests involved, we hear the same cry—impassable roads and absolute impossibility to carry on the ordinary affairs of life in the ordinary way. Our people seem willing to submit to such a state of affairs year after year without a protest, and are annually literally burying thousands of dollars rather than yield the prejudices which have grown up in our several communities about our present system of making and repairing our roads.

The necessity for improvement has been recognized in the Legislature, and numerous attempts were made during the last winter to reach some conclusion upon the subject. So many schemes were introduced, however, and the differences were so radical, that there seemed to be no possibility of a general agreement upon any particular bill. It seemed to me desirable to amend, in two or three particulars, the law which we have rather than run the risk of a failure to secure a general scheme, complete in all its parts. The most important amendment to the law, as it seemed to me, was a change in the mode of *paying* our road taxes, and if no other improvement could have been made, this alone would have accomplished desirable results. If our road taxes had been made payable in money, as other taxes are now payable, and the mode known as "working them out," now authorized by law, had been abolished, it is very certain that great improvements would have resulted, if responsible and trained supervisors could have been secured to see that the money was judiciously expended. To this end it seemed to me desirable that the supervisors should be limited to one in each township, and that

he, with trained assistants, should be employed upon the roads of the township throughout the year, whenever practicable. In this way experienced road-builders would soon have been secured, even if our supervisors had commenced without much of experience.

The basis of our road laws is the Act of 1836, and that was a year fruitful in important legislation. The Legislature had in it some of the best men that Pennsylvania has ever had in her councils. Attention was given to many important questions. Our lawyers know how important the Pamphlet Laws of 1836 are and how many prominent and practical questions had their beginnings in that year. Without in any way criticising the law or road system which was passed at that time, we must remember that it was enacted over half a century ago and with reference to the conditions then surrounding our people. In many parts of the Commonwealth we had great stretches of unbroken wilderness, and the legislator of that day was called upon to enact laws which would suit such conditions as well as those which surrounded our more populous communities. Fifty years have passed and many counties, which were then an unbroken wilderness, are now thickly inhabited. We have little timber land left except on the mountains and they, unfortunately for Pennsylvania, almost denuded of their forests. We had not then reached our childhood in the civilizing influences and physical conditions which surround us in Pennsylvania to-day. Admitting that the act of 1836 may have been wise for the time and for the conditions under which it was enacted, and that our legislators of that day gathered up wisely and well the scattered enactments relating to our roads, it is nevertheless true that we have drifted so far from the conditions then existing and are now surrounded by those which are so entirely different, that it behooves us to meet the requirements of the present, even if old laws are abandoned and old prejudices surrendered. But there may be very serious question as to whether the act of 1836 was after all the wisest that might have been adopted. The fact is that within two years after its enactment the very first section began to be amended. That section provides for the appointment of six viewers to view and lay out a road and to make return of the manner in which the duty of the viewers was discharged to the court of quarter sessions of the several counties of the Commonwealth. At least forty of the sixty-seven counties do not acknowledge the binding force of this section. Amendments changing this section as to particular counties began almost as soon as the act was passed, and have continued from that day to this with the result just stated. In many counties the act of '36 has been entirely abolished, and instead thereof special laws relating to counties and even townships have been passed so that it is difficult for one who has not made a specialty of the study of this branch of the law, to determine what the law is as to any given locality. In one county so many different laws affecting different townships are in force that they have been collected into a volume for the benefit of the members of the bar.

In the days of special legislation it was very easy to accomplish such a result as this. The people of a county, or even of a township, could secure the passage of any law which they desired; the courtesy of the Legislature making it possible for a single member to secure the passage of a law such as his constituents wanted, if he would simply vouch for the fact and would not make its provisions apply to other parts of the Commonwealth. Now, that all special legislation is forbidden by our present constitution, except the repeal of special laws already existing, it would seem desirable, in order to conform to the require-

ments of the Constitution, that we should have some general system applicable to the whole Commonwealth to take the place of the innumerable special laws relating to particular localities and communities. In order to do that it may be necessary for some localities to surrender the benefits of the law specially applicable to them, and secure in their stead something equally good, which may be applicable to the entire State.

So many considerations must necessarily enter into the enactment of any new system, that it is difficult to speak of them at this time. There seems to be a wide-spread demand for State aid in laying out and constructing our roads. It is probable that in the near future, if our revenues continue in their present satisfactory condition, and care should be exercised in making appropriations for what are not strictly State institutions, we might be in a situation to assist in maintaining our roads, as we now do in reference to our schools. The manner in which this aid should be rendered would require very careful consideration so as to prevent inequality and unfairness in the distribution. It has been urged that the main highways leading from one county to another which, in many parts of the State have heretofore been maintained as private corporations and toll roads, and have in most instances been abandoned as such, could be maintained at the expense of the State. Such an arrangement would be desirable in many ways and would tend, doubtless, to make the main arteries of communication throughout the State as smooth and solid as they were in the days which our forefathers depended upon the stage-coach for their means of public travel. There are serious difficulties, however, to be met with in carrying out the details of such an arrangement unless our road taxes were collected and applied by the several counties. The maintenance of such roads by the State would relieve the townships through which they passed very materially of their burdens, but would not afford like relief to such townships as might not border upon them. A simple and satisfactory way of affording relief to all localities equally, would be to distribute a certain amount, annually, among the several townships in proportion to population or length of road, as our general school funds are now distributed to the several school districts. There are difficulties, however, as to securing the best results from such a system which will readily suggest themselves to those who are familiar with the manner in which our roads are now maintained throughout the Commonwealth.

I have had large experience of late years in testing the public roads, having made it a point each year to drive several hundred miles with my boys in a carriage for the purpose of securing some change during their vacations and teaching them some little of the geography, extent and resources of the greatest and best State in the Union. I confess, however, that after riding one year some four hundred and fifty miles, we all agreed that whilst Pennsylvania was the greatest State in the Union, its roads might at least be improved.

Objection of a practical kind can no doubt be found to any general system which may be proposed, and yet, I have no doubt, that the Legislature can secure by general legislation such changes as are needed, without materially altering our present system or removing the control of our roads from the Courts of Quarter Sessions where, as I think, the control of them is at present wisely entrusted.

It is not expected, however, that I am to say much upon what the laws ought to be. The discussion, as I take it, was expected to center rather

about what the roads and the road laws of Pennsylvania are, with a view, perhaps, of suggesting for the careful and practical consideration of our law-makers the remedies which are needed. The subject of making and maintaining its roads whilst apparently simple is one of the most serious which any community has to solve. In this as in many others cases, economy does not consist in a minimum of expenditure. It will undoubtedly cost more in the first instance to make a good road than a poor one, but when made, a good road can be maintained at a very small expenditure, whilst every one knows that a poor road cannot be maintained at any cost.

The cost of making and maintaining roads, however, is not the most important question connected with them. The cost of transportation over them after they are made; the amount to be hauled; the speed to be attained; the wear and tear of animals and vehicles; the comfort and enjoyment in travel, all these are questions which are directly involved and which in the aggregate probably amount to more, even in dollars and cents, than the sum expended in maintaining our roads themselves.

In the consideration of this question we are not to forget that there is growing up in our several communities a large class and a by no means unimportant class, recognized by the Legislature in a late enactment as entitled to the use and usage of the road, who are directly interested in this subject. I refer to the wheel-men of this country. They, as well as pedestrians, are as much entitled to good roads as are those who make use of them with horses and vehicles of various kinds. Men who are engaged in sedentary occupations must have exercise, and the wheel is regarded as a means of securing it in an enjoyable and profitable manner. If we consider the road question from the stand-point of the agriculturists and secure roads which would benefit him, we are at the same time benefiting every other class in the community. From the time of our birth to the time of our death and burial the public road is a subject which concerns every man and every family. It is high time, therefore, that Pennsylvania awake from the sleep of half a century and commit herself to the serious consideration of this question.

A gentleman spoke a moment ago of the attitude of our legislators, and seemed to intimate that they were afraid to take hold of this subject in a practical way. I do not wish to speak of those who make our laws in an unfair way, but it seems to me that the legislator of to-day must take hold of this question, not with a view of the votes which may be cast at the next election in consequence of his action, but with a broad view of the general good and of the vindication which is sure to come to him in the end if the subject be dealt with in a wise, broad and practical way. Questions arise sometimes which must be dealt with firmly and wisely, even if men's prejudices are aroused and their opposition incurred. I do not believe that this is one of such questions. The legislator who will take a firm and decided stand upon this subject, and will aid in securing good, practical legislation in regard to it, will have the majority of his fellow citizen with him; but whether this be so or not, it is very sure that if he lose votes in the next election, he will win the enconiums of the people in the end and these will remain after he is dead. This question must not be taken up with reference to the vote of the next election, but must be considered from the broad stand-point of the interests of the Commonwealth, now and for fifty years to come.

What is the province, in reference to this subject, of the State Board of Agriculture? It can enlighten the public mind; it can mold public

sentiment and influence it in a large degree. If there go out from this meeting of the Board an intelligent discussion of this subject, it will start the thought of our people and do much to bring them to right conclusions. This will, of course, make the work of our legislators more easy and will give them the assurance of a healthy public sentiment behind them. This is all that they desire and *this* they have a right to expect. We seem to be agreed that something should be done. We are agreed that we should have better roads. We are agreed that our present system of laws, even when fully and fairly carried out, does not and apparently cannot give us what is needed. We have tried it and it has been a manifest and acknowledged failure. Let us determine that we will have something better, and let this Board in the discussion of this subject give to our people generally something which will stimulate their desire for better roads and show them how they can be secured.

This question is to occupy to a very large extent the discussions of the day. I know of no question to which the State Board of Agriculture can turn its attention which is greater than this, or more important than this, and which concerns more directly all our people. I hope, therefore, that the discussion will be practical and to the point, and will be in the direction of giving light to our Road Commission which has just been organized in Harrisburg, many members of which are upon this floor at the present time. This Commission, as you are probably aware, was created by the last Legislature and consists of three members of the Senate, five members of the House of Representatives, and five members appointed by the Governor. They represent different parts of the Commonwealth and different interests. The appointments have been made with the view of reaching every part of the Commonwealth and every business interest involved. The members are here ready to co-operate with this Board in every way possible to secure a good system of laws for the government of the whole subject. I hope the Board will extend to the members of this Commission, not only the privilege of the floor, but also the privilege of joining in the discussion of the question. If the members of the Commission desire to ask questions, I am very sure that they will be courteously met and can secure valuable information from all parts of the Commonwealth more easily than at any other time. It seems to me that it would be well for the Board to extend to this commission an invitation to participate in its proceedings.

Secretary EDGE: That is the invariable rule of the Board.

Governor BEAVER: I, therefore, extend to the members of the Road Commission the privileges of this floor and the right to participate in all the discussions of this Board upon this question and upon any other. All other gentlemen present who are interested in the subject are included in the invitation. Every citizen of the Commonwealth is interested in this question and ought to feel free to take part in its discussion and I may add in the discussion of any question which may come before the Board. The day has been set apart for the consideration of our roads, and I am sure that the time can be well spent and that good will come out of the discussion.

We have with us to-day also a committee from Philadelphia which has taken a very deep interest in the subject, which has issued some publications regarding it and offered prizes for essays bearing upon some of its practical phases. They are gentlemen interested in some of the large financial institutions and other great business interests of our metropolis, but are interested, as we are, in securing better

roads throughout the Commonwealth. We have also a committee from Pittsburgh and gentlemen from other parts of the State who have come specially and solely because of this discussion, and who desire to hear what is to be said and to inform themselves upon the subject and exert their influence along with ours in awakening a healthy public sentiment in regard to it. The interest in this question is not confined to Pennsylvania. Every State in the Union, it seems to me, is awakening to its importance. We have been a long time taking hold of the subject, and I hope we will not let go of it until something practical and substantial has been accomplished.

The interest is wide-spread and absorbing, as it deserves to be. It is not a question of partisan politics; we are all equally interested in it. We can stand upon a common platform, discussing it solely from the standpoint of the highest and best interests of our several communities, our great Commonwealth, and I might say, our common country. I hope it will be discussed in this spirit and that valuable and practical results will follow.

Secretary EDGE: Mr President: In the programme which will be presented, at this and the succeeding session, we have endeavored to divide the Road Question into two parts, namely, Road Laws, and Road Construction and Road Repairs; we have so arranged the essays and addresses that they will sub-divide the question in this way. At previous meeting we have always found it best to consider similar topics in groups and first hear all addresses and essays and then discuss them as a whole. Any variation from this plan we have found to cause a repetition in what is said and more or less confusion in the discussions. I would therefore move you that we now hear the essay of Mr. Underwood and the address of Mr. Gundy, and then have the question of Road Laws opened for general discussion, and I would respectfully ask those who may speak, to as much as possible confine their remarks this afternoon to Road Laws and their effect and results, and avoid the questions of Road Construction and Road Repairs until they are brought up by appropriate addresses and essays this morning. Past experience has shown us that by strictly following this plan, we may avoid much useless repetition and unnecessary confusion.

Resolution adopted unanimously.

The PRESIDENT, (Governor Beaver.) The next topic is the Public Road System of Pennsylvania, which will be presented by Hon. N. F. Underwood, member from Wayne.

THE PUBLIC ROAD SYSTEM OF PENNSYLVANIA.

N. F. UNDERWOOD, *Member from Wayne, Lake Como Pa.*

Prominent among the important questions claiming public attention at the present time, is that of roads, highways and bridges. Nor has this subject failed to receive consideration in the past, for numberless acts of Assembly bearing upon the laying out, opening, and keeping in repair of highways for public travel cumber the statute books of our commonwealth, and in their variety and complexity form such a conglomeration of legislative patch-work as can be found applying to no other subject. To set forth clearly and concisely just what road laws

are now in force, and to define the limits within which each is operative would require the labor of weeks, and occupy more space than could be accorded to one essay. Suffice to say that existing laws in our State may be classified as the acts comprising what is known as the general road law and of special laws applying some to particular counties, others to particular townships. In the old days of local legislation, when by an easy system of log-rolling, every township might have a road law of its own, nearly every township in some counties availed itself of this privilege, and changed as often as it would, until by the constitution of 1874 they were shorn of their local prerogative. From that time until the present continued effort has been made to merge all this unwieldy mass of local statutes into one general law applying to every road district in the State. While some progress in the direction has been made and the repeal of many special acts has brought the several townships affected by these repeals, under the general road law, a feeling has been growing, and gaining ground, that there is something radically defective in the whole system, (if anything so unsystematic deserves to be called a system) and that while the law, on its face, seems to give those charged with its execution all needful authority and clothe them with ample powers and means to place and keep the roads in good repair, yet the result continues to be disappointing and unsatisfactory. Instead of coming up to the requirements of highways in proper condition for safe and convenient traveling, our roads in too many localities are given over to the dominion of their most active enemy, and have become water ways, and the passing years bring little improvement. Instead of inviting traffic and affording smooth and firm avenues for the moving of burdens, they repress enterprise, discourage travel and make the moving of even moderate loads an expensive and unpleasant task. That the need of a revision of our road system has been already recognized is evidenced by the fact that nearly every General Assembly that meets in our State has under consideration one or more road bills, looking to the enactment of a new general law. Only those who are in some degree familiar with the history of past efforts in this direction can realize the difficulties that lie in the way of its accomplishment. It may be sufficient at present to say in regard to the nature of these difficulties that no bill has yet been formulated which could command general approval. Not because present laws are considered satisfactory, but because no agreement could be arrived at concerning the details of a new law, some even going so far as to insist upon the retention of the worse feature of our present law, the working road tax. So much has been said and written upon this convenient device for avoiding the payment of taxes, that it may seem needless or useless to further inveigh against it, yet reform sometimes comes through persistent agitation and the urgent need of reform in this particular may be pleaded as an excuse for here referring to it. We cannot even admit that the theory of law, on this point, is sound, for this infers that the convenience of the individual is of greater importance than the interest of the public, also that it is to the interest of the average tax payer to work out his tax at one dollar per day, and find himself; but the practical part of the business is much worse than the theory. Theoretically, the supervisor has only to call on the taxpayer to come on the road, and work out his tax, and he must respond at a few days notice.

In practice, the taxpayer pays no attention to such notice, unless it happens to be then convenient, but works out his tax in thirty, sixty or ninety days, and frequently he does not work it at all. In theory,

the supervisor may call on any road except the one he has most frequent occasion to travel. In theory, the roads are to be repaired, and the tax worked out, in the early part of the season, and to re-enforce this common sense requirement orders of court are sometimes promulgated enjoining supervisors to be vigilant in enforcing the rule. In practice, the taxpayer laughs at court and supervisors, and perhaps gets ready for road business just before winter sets in. Theoretically, the supervisor is the supreme authority in township road matters, and his dictum settles all controversy. In practice, the supervisor is the servant of the taxpayers who elected him, they reserving the privilege of running the dictation end of the business. This "work out the tax" plan of road making may have been necessary in the days of pioneers. If it served a useful purpose then, its day of usefulness ended long ago, and it should be laid to rest along with the pioneers whom perhaps it helped in this emergency. We are justly proud of our material development in many directions, since their day, but our roads are a discredit to the present generation, and the prospect under the present system in discouraging rather than hopeful. Yet there is nothing unusually difficult, or insurmountable, in the matter of building and maintaining good roads. Other enterprises, equally difficult, equally costly, are planned engineered, and carried through successfully. The same intelligence, the same energy, the same practical skill, the same thorough supervision, will show as good results when applied to road construction, as when applied to building a trans-continental railway stretching a Brooklyn bridge across the East river, or driving a tunnel under the Alps. Assuming that there is substantial agreement as to the necessity of a revision, and that the sum of individual opinion, as expressed in the present discussion, may have some bearing upon the final solution of the question "what should be changed and what retained in framing a new road system?" Suggestions are in order. Shall there be an entire surrender of the business and control of road construction to the State?

Upon that question I must vote "no." Serious as the situation is, it does not seem to be sufficiently grave to call for so radical an innovation. The working machinery of such a system could not be otherwise than cumbersome and whether deservedly or not would not fail to create a suspicion of extravagance and jobbery. The single aim and object of revised system should be improved roads. Good roads will make necessary an increased expenditure. Sooner or later, directly or indirectly, the amount expended must be paid by the people, the taxpayers and producing population of the State. Let the whole business of raising, handling and expending this money be kept as close to the people as possible. Good policy, economy and conformity to the principle of local self government, suggest such a course. Let the paternal care of the State be exercised in furnishing skilled engineers or superintendents, to assist in planning and constructing all stone or other permanent roadways, and all bridges in exposed situations, but let the unit of the road system remain as it now is, the township. Let the people understand that such change as is made is to be made in their interest and not in the interest of office holders and place-men. Let them understand that the change means better roads for them and for the general public, and they will rally to the support of the system, and cheerfully bear their share of the public burden for the sake of the good to be accomplished. They will do this all the more readily knowing that the amount raised is to be retained in their midst and expended

for their own immediate benefit, instead of going into a general fund, to be applied they know not where nor how. In contributing my quota of sage suggestions as to what an efficient and satisfactory road law should provide for, allow me to present a few points negatively. No system will succeed that does not place the business of roadmaking upon an entirely independent basis. As railroads cannot be successfully built by men whose time is chiefly occupied with other employments, no more can public roads. No system will prove satisfactory that does not provide for constructing some amount of what may be called permanent road, every year, beginning with the more generally travelled thoroughfares, and extending the work to other roads as time and means will permit; at the same time not omitting such repairs on the ordinary earth roads as their condition may require. No system will prove complete that does not provide for adequate superintendence by at least one competent state or county road officer in each county. This officer should have the qualifications of a good civil engineer, in order that he might understandingly advise and decide upon such matters as the proper grading and cross-sectioning of road bed, making estimates of amount of material to be removed where excavations are necessary and cost of same, the number and capacity of necessary sluice-ways and culverts to maintain sufficient drainage below road bed, (not into it,) amount and kind of material needed in constructing stone roads, setting up and operating machinery for its preparation, etc., and especially in determining of what material, at what elevation and with what discharging capacity bridges across both large and small streams should be built, water being the great destroyer of both roads and bridges, as the experience of the past season has so signally demonstrated. In this matter sufficient skill and judgment are required to provide, not only for the safe discharge of the rainfall of our average seasons, but for the phenomenal downpour of seasons like 1889. For so sure as our streams are bordered by their valleys or water plains, which have been formed by the deluges of years or ages past, so surely will they occasionally in the future overflow their banks and spread their turbulent floods to the verge of the hills. A proper appreciation of this fact would have saved the citizens of our state, during the past year, a sum startling in its aggregate, could the actual amount be ascertained. In my opinion this matter of competent engineering and supervision will be of vital importance in any system which contemplates in its scope the making of substantial and durable highways, and the time has come when no system that does not make provision for such work should be tolerated. The roads of the future should be built for permanence, for economy of use, rather than economy of construction, even if to build them involves pledging the credit of townships for a term of years to secure the amount needed for the work, even if to secure the best grades and the best ground for roadbed, it involves changing the location of roads of unsuitable grade, for as streams cling to their original channels and cut deeper and deeper into their valleys, so have the roads of the forefathers clung to their original courses and cut down deeper, year by year, into the steep grades of the hills.

In conclusion, let me say that the next General Assembly which meets at this capital will have to consider no more important work than that of framing and enacting a law which shall enable our people to enter upon a new era of road improvement. Never before has there been such a full and free expression of opinion. It is not to be expected that there will be entire agreement, yet out of the mass of opinion and suggestion it

ought not to be difficult to catch the drift of the prevailing sentiment. If, as we believe, the general opinion is in favor of a new departure in the business of road making and in favor of better—immensely better roads—let us have such a change in the laws as will enable our people to provide adequate funds to carry on the work and the requisite skill to plan and superintend it, neither of which are possible under our present general law.

The PRESIDENT. The discussion will be opened by Mr. J. A. Gundy, member from Union, upon "The Road Laws of Pennsylvania."

Mr. GUNDY. Mr. President. I had intended to have had a written paper, which I have, as you notice; but it was hastily written, and only an abstract of what I propose to say.

I hesitate somewhat, to offer advice to so eminent a body as that which has charge of the revision of the road laws of Pennsylvania. I have not a particle of doubt that you are men much more competent than I am; but what I have written here is what I wish to say to this Board as the chairman of the Committee on Roads, and, if what I have to say meets your approval, all right. As you well know, it is the opinion of only one man. However, I want to say this, that if this road commission shall succeed in formulating a road law for Pennsylvania that will be acceptable and suitable to all portions of this State, I will in my mind think they were inspired by the same spirit that inspired the Mosaic Law governing the world. I hope they will succeed.

That a general road law is needed there can be no doubt. But that there are great difficulties in arranging a general law suitable to all sections of the State is equally evident—caused by the varying conditions of soil, cost of obtaining road material, density of population, wealth and business of the various sections, as well as the intelligence and progressiveness of the people.

Not all public roads should be equally well made. To macadamize many of our roads would be reckless extravagance—some are absolutely useless. But the more important thoroughfares leading between the larger towns should be constructed on some similar plan according to a given standard. This standard should be fixed by the State. A general supervisor should be appointed for each county, who should direct the kind of road to be made, to be governed by the amount and kind of traffic to be carried over the road. A local supervisor for each township should be elected to see that the roads are made in accordance with the directions of the general supervisor.

This local supervisor should give bonds and be held personally and primarily liable for damages arising from a neglect of duty. All road taxes should be made payable in money.

I want to say on this, that last winter a number of bills presented to the Legislature were shown to me as chairman of this committee; but I do not recall one single bill that proposed to have this tax paid in money. Why that is the first letter of the alphabet.

Now, sir, last year I sent out a circular for answers to questions as chairman of this committee. They went to every commissioners' office in this state, to all the members of the Board of Agriculture, and to gentlemen in the State who I knew were interested in roads. In answer to the question, "Should all tax be paid in money?" The answers that came were surprising. Almost universally—I do not know of a single instance of members of the Board of Agriculture, or gentlemen

throughout the State who were equally interested—the answer was in the affirmative. But all the county commissioners, who wanted to be re-elected, or a very large proportion of them, said “payable in work,” simply because they wanted to be returned to their office.

All road taxes should be made payable in money, and the State should bear a part of the expense of constructing the main lines of road while the tax laws should be so amended as that all kinds of property should pay its share of the burden.

But no matter what laws are passed, unless they have the sympathy of the people they will not be enforced. To obtain the sympathy and support of the people for a radical change in our road laws, we must educate them to know the advantage and the economy of better roads. This educating can best be done by selecting the worst portions of our more important road and thoroughly macadamizing them, they may see the value and economy by an actual and close comparison, for you only know what things are by comparison. You only know what sweet is by having tasted sour. This is well shown by the educating influence of the Cassatt road in Chester county, and also in our own county of Union. Some fifteen years ago one of the worst sections of a four mile road leading out of Lewisburg was thoroughly macadamized. The track was made wide enough for two wagons to pass. The stones were easily obtained at the side of the road or within a few rods, were broke with hand hammers, and cost I am told \$4 per lineal rod, or at the rate of \$1,280 per mile. The supervisor who constructed the road was voted out of office the next spring, as might have been supposed. But now after fifteen years with not one dollar spent on this section for repairs and a first class road yet, it is admitted by the tax payers to have been the cheapest road in the township, and the supervisor now receives the credit due him at the time. A public road should be macadamized only a sufficient width to suit the amount of travel, as all would rather drive on a good soil road when not muddy or dusty than on a hard stone road. Then we want a narrow stone track and a summer or soil track on each side.

But who can tell what will be the coming roadway of the twentieth century. Roads like the Appian Way, near Rome, that has stood for 2,200 years like the Pyramids and the Chinese Wall, belong to an age that is past. Labor is too expensive for such work, except in our more populous cities. The McAdam road, a cheaper form of road, has been in use for 100 years and surely the inventive genius of the twentieth century will improve on this system.

It looks as though the coming road would be a steel rail held by a steel tie, possibly similar to our street railways.

But whatever permanent improvements are made in our roads they should be such as would best suit the roadway that seems most likely to be adopted. And possibly nothing will better fill this requirement than the narrow McAdam stone bed, suitable to drive on, and making at the same time a most excellent foundation for a steel-tied steel rail.

The PRESIDENT. The subject is now open for general discussion. The division of this subject, as you will notice by the programme, is, during the morning “The Road Laws of Pennsylvania,” and during the afternoon “Road Construction.” Perhaps it will not be possible to keep this division clearly in mind: but the subject is now open for general discussion.

Governor BEAVER. Any citizen of this Commonwealth, and any gentleman from a sister state, is invited to take part in this discussion. I

understand there are some gentlemen here from New York, or, if not, who are expected to be here to participate. I learn that this question is being discussed in New York as well as here; and if any citizens of sister states are present we gladly welcome you.

DAVID WILSON, of Juniata county. I would like to emphasize an idea suggested in one of these essays, that is, that every county should have a practical as well as theoretical engineer and superintendent to build the roads of the county. I do not believe we will ever have good roads, and roads well maintained, until that is the case. The county surveyors that we have now generally are not practical engineers. They may be able to survey land, but they are usually not thoroughly educated for engineering purposes. If a county has some such officer as that, he can take the worst roads of the community and look after them in ways that surveyors sometimes cannot. If he is a man of the right stamp, and has had a practical as well as theoretical education, he will know what a good road is, and be able to make one. In addition to that I think every township ought to have one supervisor, and usually one only, and that supervisor should be under the general control of the county engineer. It would not be necessary for him to be an engineer; and in order that jealousy might be kept down, every township ought to have its own supervisor. I think these two ideas should be looked after. I think without these two persons, properly appointed and properly endowed, you will ever have good roads. Whether they should be appointed by the court or by the Governor, or be elected, that is the question. The courts do not like to appoint many officers, but I believe that courts could appoint them better than they could be elected at general elections.

WILLIAM H. RHAWN of Philadelphia. I avail myself of your kind invitation, and desire to express the great gratification that I have at being present upon such an occasion as this where leading representative agriculturists from all parts of the state are assembled. We of Philadelphia feel a deep interest in the subject of roads—and when I say Philadelphia, I beg you to understand that really we take in the surrounding counties, upon this road question at least—the four counties of Bucks, Montgomery, Delaware and Chester, that surround Philadelphia, are the homes of a large number of the active, pushing, driving men of the city. They need good roads. Hence they are deeply interested in the question.

We have endeavored to give you some idea of the interest we feel in this subject by sending you circulars, which have been placed in the hands of your secretary, entitled “A move for better roads.” At our request the secretary has distributed these papers throughout this body in order that you may read what we are doing, and the character of the men who are engaged in this important work. Some of them, no doubt, are well known to you. If I should be allowed to mention the names of some, I would say that Mr. Charles Richardson is an iron master in Montgomery county, and a manufacturer of fertilizers in Charleston, South Carolina. Mr. Joel J. Baily, probably known to most of you, is at the head of our leading notion houses, and also at the head of the Citizens’ Municipal Association, which is engaged in looking after this very thing in the city of Philadelphia, its streets. Mr. Edward Longstreth was until recently a member of the great locomotive house—The Baldwin Locomotive Works. Mr. Joseph Wharton, your president will know very well as a public-spirited citi-

zen, who within a short time has contributed \$120,000 to the University of Pennsylvania toward the cause of education, and especially the Working School of Finance and Economy. As to Mr. George B. Roberts, I suppose it is only necessary to mention his name. We all know him as the president of the greatest railroad in the State, the Pennsylvania. Then we have the name of Jay Cooke, the great financier of the century. Then follows the name of Mr. John R. Fell, a large coal miner in the interior of the State; Mr. T. Broom Belfield, a heavy manufacturer on Broad Street; Mr. Charles F. Berwind, of Berwind, White & Co., another large coal mining concern. Then George W. Childs—I presume everybody knows him—as the proprietor of the *Public Ledger*; George de B. Keim, late president of the Philadelphia and Reading Railroad Company, and now president of the Philadelphia and Reading Coal and Iron Company. Henry W. Sharpless, of the firm of Sharpless Bros., known for half a century in Philadelphia, Henry H. Houston, a gentleman who has himself spent within the last year or two \$25,000 in the construction of macadamized roads through property that he owns. Justus C. Strawbridge, the head of a large dry goods house in Philadelphia; Benton K. Jamison, a banker who has traveled this State from one end to the other in the coach called the “Rambler,” and who is probably as familiar with the roads of this State as any man in it—from actual travel. Then N. Parker Shortridge, a director of the Pennsylvania Railroad Company, and a man acting in a great many financial matters in Philadelphia. Then Beauveau Borie, the banker, and Eben. C. Jayne, the head of the great drug house of David Jayne & Son; Charles C. Harrison, a gentleman whose name has recently been mentioned in connection with the mission to Russia, the head of a large sugar refining establishment. Edward C. Knight, to whom is due perhaps more than any other man the Bound Brook railroad, which is the only competing railroad line of the Pennsylvania railroad between Philadelphia and New York. Also a large sugar refiner in Philadelphia. Alexander J. Cassatt, late vice president of the Pennsylvania Railroad Company, and a man who has done more to show what good roads are, and how to construct them, than any man that I know—a man who says that what is needed is somebody to supervise the supervisor. He is an educated engineer, and was advanced from grade to grade until he became one of the leading men of the Pennsylvania Railroad Company; and when he moved to his country home near Bryn Mawr, he took up, with all his engineering knowledge, the subject of the construction and re-construction of common roads around him, beginning, as every man should, at his own door and, he has built roads there which are a model. There is not a better road than the Lancaster turnpike running out of Philadelphia—at least not that I know of. That is due to Mr. Alexander J. Cassatt, Mr. Charles Hartshorne, who is a managing man of the Lehigh Valley railroad. Mr. John H. Converse, the managing man of the Baldwin Locomotive Works and a member of the firm. John Sellers, Jr. of the firm of Sellers & Co., known all over the country as manufacturers of machinists’ tools. He is also largely interested in the mills of an immense flour manufacturing establishment. Craige Lippincott is at the head of the great publishing house of J. B. Lippincott & Co. Joseph E. Gillingham, is a railroad man in the city of Philadelphia. John Lower Welsh is also another leading railroad man. William Hacker, treasurer, is in charge of the Canal Department of the Pennsylvania

Railroad Company; while Professor Lewis M. Haupt, who is at my left, is at the head of the engineering corps in the University of Pennsylvania.

Now, I have gone over these, in detail, in order that you may see the character of the men who are interested in this work. These gentlemen are contributing to a fund for the purpose of giving prizes for the best papers on the Economic Engineering and Legislative Features of Common Roads. They are seeking for information. These circulars have been seen probably by 10,000 engineers in this country and in Europe. We expect these gentlemen to compete for these prizes, and in that way we expect to collect a fund of information from the class of men who, of all others, should know how to make a good road; and it is the legislative difficulties that now lie in the way which prevent them from making such roads.

After we get these papers, we then propose to have a second competition—a competition for the best draft of a legislative bill, which will embody all the best features to be gotten out of these papers on road making, and from any other source that will help to make it a good road law. We propose to give the newly appointed road commission the benefit of our work, to see if it will not result, with what has been done by other parties, in presenting a satisfactory bill to the next Legislature.

I have jotted down a few sentences which embody about all I intended to say, and which I will read; and then, with your permission, I will ask the President to allow the secretary of our committee, Professor Haupt, an opportunity to say a few words.

It will, probably, not be questioned that the people of the United States are, as a whole, better fed, clothed, housed, warmed, lighted, transported and taught and have more hours of leisure, than the people of any other nation or of any previous generation of our own.

The marvelous material development of the country, through which such happy results have been attained during the lives of men still young, is due to steam, electricity, the inventive and adaptative genius of our people, stimulated and aided by education and applied science, and to their wonderful power of association brought to bear upon the natural resources of the country.

One of the most potent factors in this unprecedented development of the last half of the nineteenth century is the gigantic system of railroads that traverse the land in every direction, affording means of transportation undreamed of by past generations. In the development of this system, so novel in the history of the world, the highest scientific talent has guided its most capable and energetic men until nothing seems impossible of achievement by the railroad managers and civil engineers of the country.

But while the nation has thus been making giant strides of progress in almost every other direction, there is one in which we seem to have made no progress worthy of the name. While we have built our magnificent roads of steel across and up and down the continent, over which we ride at the rate of a thousand miles or more a day, and transport millions of tons of freight, the common roads at our doors, leading to our railroads, remain much as they were a century ago. While we have been busy bridging torrents, scaling dizzy heights, tunneling mountains and tracking deserts, in making a way over which the iron horse outstrips the wind, we have forgotten the farmer, who still plods along, his wagon hub-deep in the mud, between the farm and the station,

taking half a day to make a trip that should be made in half an hour. Indeed, it is said that during this winter farmers living within ten miles of cities have for six weeks been unable to get to them with any vehicle on account of the impassable condition of the roads.

It is easy to see why, in a new country of almost boundless area, we have devoted our energy, scientific skill and wealth to the building of railroads, to the neglect of our common roads, which are the worst of any civilized nation. But for the present we are well supplied with railroads, and it is full time that we should turn our attention more to our common roads and apply to their improvement some of that energy, engineering skill and wealth that we have heretofore lavished upon our railroads. That such is the growing conviction of thoughtful men, and that there is a general awakening all over the land upon the subject of better roads, is manifest to every careful reader of the journals and periodicals of the day, and it is most forcibly shown by your presence here from all parts of the State to discuss this question.

Philadelphia has a deep interest in this absorbing question. And by Philadelphia is meant not only the built up city with its hundreds of miles of streets, but also the adjacent counties of Bucks, Montgomery, Chester and Delaware and the suburban portion of Philadelphia County with its hundreds of miles of common roads, which five counties embrace a large part of the population and wealth of the State, in the rural section of which are the homes of a large proportion of the active and progressive men of business and affairs of the great city, as well as those of wealth and leisure, who maintain summer residences in the country and winter homes in the city. The ease with which rapid communication by railroads is had between the city and this rural section is rapidly adding to the number of those of moderate means who, while following their daily vocations in the city, reside in the country throughout the year. With better country roads to supplement the railroads, this tendency of city toilers to find homes in the surrounding country will increase indefinitely.

As fully explained in the copies of the circular of the committee placed in your hands, and which has been brought to the notice of thousands of people throughout the State and upwards of ten thousand civil engineers in this country and Europe, the move for better roads recently started by citizens of Philadelphia, under the auspices of the University of Pennsylvania, recognizes the fact that the time is ripe for action in this matter of transcendent importance, and it seeks to give the movement proper direction at the start by endeavoring to ascertain from those best qualified to teach us, the best engineering, economic and legislative features of construction, re-construction and maintenance, and all the advantages of a thoroughly scientific treatment of our common roads; and having ascertained them as far as practicable, it proposes to embody all the essential requirements of a good road-law in the best legislative bill that wisdom may devise, which it is hoped will serve as a model for adoption by the Legislatures of this and other States.

It is believed that the same high character of engineering skill that has achieved the best and highest economic results yet attainable in the construction and maintenance of our railroads, is required to secure like results in the construction and maintenance of our common roads, and that any system adopted by the State for the proper improvement of its highways, must provide that they shall be placed in the hands of competent civil engineers to plan, direct and supervise the work.

No argument is needed to convince the people that a good road is more desirable to drive over than a poor one, but it is necessary to demonstrate, to the satisfaction of tax-payers and law-makers, the greater economy of the better road and the advantages of scientific construction and maintenance, under skillful civil engineers, and it is believed that such demonstration may be readily had. It is confidently expected that the result of the competition invited by the committee will not only show the greater economy of good roads over poor ones, as applied to their construction and maintenance, but that the value of property is greatly increased by the permanent improvement of contiguous public highways. The *Mont Clair Times* states that the result of recent improvements of the roads in portions of New Jersey has already doubled, and in some cases quadrupled the value of the farm lands traversed by such roads. The *Pittsburgh Chronicle-Telegraph* recently said that the macadamizing of a piece of road in Ohio increased the value of the adjoining farms over four and a half times the cost of the road.

Our Governor wisely called attention to this all-important subject in his last message, and his example has recently been followed by the Governor of the State of New York. Following the suggestion of Governor Beaver, our Legislature at its last session provided for the appointment of a commission "to revise and consolidate the laws relating to the construction and improvement of the roads and public highways of this Commonwealth, and also to consider the advisability and practicability of the State assisting in the construction and improvement of the same." The appointment of this commission has recently been completed, and the committee having the Philadelphia movement for better roads in charge have been encouraged by the expressions of satisfaction, commendation and good will already received from members of the commission, with whom we desire harmonious relations, in the hope that we may be of assistance to each other in efforts to a common end. The committee also earnestly desire the sympathy and co-operation of the State Board of Agriculture and other organizations, and of all public spirited citizens throughout the State seeking to obtain better roads.

Professor LEWIS M. HAUPT, University of Pennsylvania. Your Excellency, and Gentlemen of the Board of Agriculture: I am here because I feel a very great interest in the roads of Pennsylvania. I believe there is no subject before the State which is of greater importance. I have listened with great interest and delectation to the remarks of your Excellency. I wish every member of the Legislature entertained the same views. I suppose then the chief obstacle would be removed. It is very much more difficult to overcome an obstacle of the mind than the inertia of matter.

I desire to add only a few words on the advantage to the State of general lines of inter-communication, and that shall embrace, if possible, more fully and more desirably the improvement in the department of roads as a matter of economy. So far as the educational feature goes, the first thing to be done is to educate the people in regard to the importance of this movement, and convince them, if possible, that they will save money by investing in better roads.

The transportation interests of the State are mutually related and inter-dependent whether the route be by water, by rail or by road. What this relation is, and the importance of these several means of communi-

cation, will depend upon the resistances to movement along these lines measured by time and *cost*.

The latter, viz. : the cost is the most important element, as it expresses the economic conditions of the various lines better than they can be determined by any other unit.

Let us consider for a moment these relations, as thus measured, and determine where the greatest resistances are to be found in our transportation system, for this is the first step in any move looking to their improvement.

The capacity of a system, as of a line, is determined by its point of greatest resistance.

Taking the ton-mile as the unit, we find at the present time the cost of the movement, in bulk, with the most approved rolling stock and under the best conditions, that the rate by wagon on common road is about fifteen cents per ton per mile. These figures are very suggestive. To move a ton per mile upon a road fifteen cents is stated to be the minimum of expense; by cars on a standard railroad it is about one half cent.

By boats on canals it is about one-third c.

By ships on rivers and lakes it is about one-fourth c.

By ships on ocean it is about three-fourth mill.

To determine what these figures mean let us reduce them to a common denominator and their results :

	<i>Actual cost mills.</i>	<i>Relative cost.</i>	<i>Relative distances.</i>	<i>Relative areas.</i>
Roads,	150	200.0	1	1
R. R.'s,	5	6.6	30	900
Canals,	3	4.0	50	2,500
Rivers,	2.5	3.3	60	3,600
Ocean,	0.75	1.0	200	40,000

showing the enormous advantage that the ocean traffic has over any other system. But this is not the subject open for discussion now. It is referred to simply for comparison.

WHAT HAVE RAILROADS DONE FOR THE FARMER.

Now, it is said by eastern farmers that the railroads have injured them by bringing western products into competition at lower rates and so absorbing their market.

Let us examine this proposition and discover, if possible, the cause of the injury.

There are two channels over which products may be carried, one by wagons on common roads, the other by cars on a railroad. In the first place let us assume that a four horse team can haul on a good road a two ton load of oats, valued at \$40, a distance of 20 miles per day.

If the cost of the movement be taken at \$5 per diem it will give twenty-five cents per mile. The value of the load will therefore be consumed in going 160 miles, leaving nothing for the return trip, unless there is back loading, which would be equally consumed. By rail we may put the cost of movement at one cent per ton per mile, or two cents for this two ton load (taken in bulk). It could therefore be carried 2,000 miles or twelve and a half times as far. If therefore such lines were to radiate from a common center, the wagon area tributary to a market would be limited by a circle of 160 miles radius or 25,600 square miles, while the railroad area would have a radius of 2,000 miles, or 4,000,000 square miles of area. This is larger than the United States. The ratio of these

areas, 1 to 156, indicates the relative economy of common roads to railroads at these rates of tariff. If the common road rate can be reduced, the advantage of the railroad is to that extent diminished, and there is no doubt whatever that this can be done with great resulting benefit to the farmer.

But we may ask who gets the benefit of this great economy effected by the reduced cost of transportation by rail? Is it the city where such roads terminate, where the competition is brought to a focus, and where the consumer can buy to advantage? At first glance it might seem so, but let us suppose the railroad system blotted out of existence, and our large manufacturing communities dependent upon wagon roads for supplies of fuel and subsistence. How long would present prices be maintained, and what would be the effect upon the manufactured article sent out from such centres. What would not the farmer have to pay for his clothing, furniture, tools and implements? The price would soon be so far out of reach, that he would be obliged to turn manufacturer as in days of old, and re-instate the spinning wheel, loom, blacksmith shop and furniture factory, and surrender the time which may now be devoted to more intellectual pursuits or recreation to the drudgery of providing the necessities of food and clothing. Whilst the railroad has extended the market range, it operates equally in both directions, for it is a poor rule that does not work both ways.

The point of greatest resistance between the farm and the market is the link connecting the barn with the railroad station, and it often costs more to convey the produce over these few miles than to move it hundreds of miles by rail. There are seasons when no amount of money will serve to move the produce. If prices were quadrupled the farmer could not get out. He is besieged by the Frost King as effectually as if immured in a dungeon, and must hibernate until the genial sun aided by the drying winds remove the barricade and open the door.

This lost time is a serious tax which it is difficult to estimate in dollars and cents.

It is, therefore, evident that the greatest resistance to inter-communication is to be found in our commonroad system which is in a deplorable condition, due to inefficient legislation, supervision and improper construction.

We cannot have a river or canal in front of every farm, and thus the great advantages of a public highway on which any one may put his own boat cannot be made general. With the railroads the case is different—there is but a contracted way operated by a corporation. Here there are streams of rolling stock passing at stated times, and the shipper must deliver his freight at some station, pay his tariff, and trust to the company for safe and rapid delivery.

In the case of roads the matter is very different. Roads are or should be public highways, on which any citizen may put his team and haul his produce whenever and wherever he may choose, with the least possible resistance, in the least time, and at least cost.

These highways should, therefore, be provided by the State, and be in charge of a competent board of supervisors as well as a competent engineer, for there are many instances in which such intelligent supervision will save many times the cost of maintaining such an organization, and will add very much more to the value of farms and products than the cost of providing such roads.

It is therefore evident, from the drift of these few suggestions, that the State should take a very large and material part in this important

matter, and direct this reform movement; that the State itself should bear its portion of the burden, and that the parties interested should bear their part. Not only the farmers, but the manufacturers, and all persons in the State, should gladly contribute towards this important and enormously advantageous public improvement.

The subject of the construction of roads, I believe, will come up later in the day.

The PRESIDENT. (Gov. Beaver.) If the cost of moving a ton of freight by road, as it averages now, is as one to thirty, as compared to railroads, have you figured what it would be if our roads were in right condition?

Professor HAUPT. The answer to that would have a great variety of subjects dependent upon the amount of resistance on the surface. As you are well aware, there are features of comparison, and some which will annul others in giving the resistance of the surface to the motive power.

The PRESIDENT. (Gov. Beaver.) On the question of hauling, say.

Professor HAUPT. Yes. It is difficult to give the different amounts of resistance on various kinds of country road. But the resistance on an iron tramway, well laid, may be taken as one two-hundredths of the load itself, while on the common road it may be taken as one-fifth or one-fourth, and it would therefore take 400 pounds to move this out. This on a road in bad condition; where on the same road improved it would only require one-fiftieth of the weight of the load to move it, or forty six pounds per ton.

The PRESIDENT. (Governor Beaver.) Then, if we had good roads, compared with what we now have, a horse would haul from twenty to forty times as much.

Prof. HAUPT. Yes, Sir.

Col. FRANK MANTOR, of Crawford Co. Mr President. I am glad to avail myself of the opportunity given to "citizens out-side" to take a part in this meeting. Since the mooted question of building our roads and public highways by the Legislature last winter, I have taken considerable interest in the matter, and there rests no doubt, on my part, that the improvement of our public roads would be a great public benefit. I believe that no question has come before the people of Pennsylvania that has called out, or attracted as much attention in so short a time, as this, of the improvement of our roads. In looking over a multitude of bills that was presented to the Legislature last winter, it must be apparent to every one who reads anything of the proceedings of that body, that it was almost impossible to make any law that would meet the general demand throughout the State. I am very sure that what I said here would have been true, had some of those bills passed, and presented to your Excellency, (Governor Beaver in the chair) you would have written under them, "disapproved."

Mr. President. The establishment of a Commission to look into the feasibility of the improvement of our public highways, I regard as one of great importance. I have never known in all my experience in this state, (and I am to the Manor Born) an Executive of this Commonwealth that has taken such an abiding interest in this subject, as his Excellency the Governor, (applause). But in looking at this matter, and listening to the discussion this morning of a proposed law that seems available to reach out over this broad Commonwealth of 46,000 square miles, and with thousands of miles of mud roads, it seems to me a deep problem

which would be the better law to reach out its arms and grasp this important subject.

Mr. President. I propose to trouble this body with but a few remarks. This commission appointed on the part of the Legislature, and your Excellency, have met to-day, and have completed their organization.

These gentlemen who form this commission have been selected with a view to represent the different sections of the State; and being men of practical experience, will leave no stone unturned to obtain such information as will lead to the enactment of some law that will in the end prove of great benefit. We see before us several of those gentlemen who are a part of this commission, and we utter in their presence what we think they will find in the end, that they have an herculean task before them. I do not believe that any plan that can be hit upon, or law passed, that will give universal satisfaction to the people throughout the Commonwealth. A law can possibly be enacted to have its bearings in the different sections of the state. I come from a county (Crawford) where we have no stone; and the building of McAdam roads in my section is impossible. We have not one pound of limestone, only that which is brought from the upper lakes, and around Saginaw, and we have but a very little of any other class of rock. But Mr. President, this is on the construction of roads. But upon the fact of laying out and maintaining roads, I shall run adverse to several of the speakers here this morning. While I am not very antagonistic, and while I would not throw anything in the way of this commission, but would prefer to aid them in any way in my power.

Mr. President. I am opposed to the proposition that gentlemen have offered here this morning, and that one in particular, of opening up thoroughfares extending from one side of the State, to the other. As has been suggested, "any number of them from six to a dozen," and I am inclined to believe that when gentlemen come to take a "second sober thought" over that matter, they will abandon the idea as one that is obtuse, and one that ought never to be entertained. We have to-day in some parts of this state some of the best roads I have ever known. On the other hand, I do not believe you can rake Creation over with a fine comb and find meaner roads than you can in some places in Pennsylvania. (Laughter and loud applause.)

The proposition made by Professor — on my left, and by two or three gentlemen on my right, that we should have "some law passed to take money from the Treasury of the State," to aid this enterprise, might at first sight appear a very harmless proposition. Every one present who is conversant with the past history of this State can call to mind, when just such propositions as this one, were enacted into law; and the state loaned her credit for the building of state roads, or thoroughfares; such as building a road from Philadelphia to Pittsburg, and one of which his Excellency the Governor referred to in his argument to-day, that of the Erie and Waterford road. I have something of a recollection of that road myself, and when it was abandoned as a corporation, it owed to the State quite an amount of money which it could not, nor never did pay. The same can be said of almost every other thoroughfare, of like character, who drew money from the Treasury to aid such enterprise. These were among the sums appropriated for public purposes, that aided in launching our state in a debt amounting to nearly forty-two millions dollars, for which the state has been struggling for almost forty years to extricate itself. Now, while we are

so nearly through with a debt brought on by an over-weaning desire to build up public thoroughfares, and if in the future we suggest to take money from the Treasury, we should first stop and take account of the mishaps of the past. If you will take the Auditor General's report, you will find that it was not until some time within the past eight years, that the list of credits given to those thoroughfares were disposed of, at a mere moiety, and what was not disposed of, was passed up to the credit of Profit and loss.

There is an old adage, which says that "*an ounce of prevention is worth a pound of cure.*" I am aware that it will be argued by some that the money in the Treasury of the Commonwealth belongs to the people of the Commonwealth. In one sense this is true; but in the broader sense, we say that the people through their representatives, are but the custodians of the funds of the State, and any unequal distribution of to such funds would in the end work great injustice. I would not object a law that would demand of any county, which through a fair expression of the people, wanted to loan an amount at a very low interest, say two or two and a half per cent on long time, for the State to grant such loan. But under no circumstances would I encourage the loaning of the State funds without ample security. Now, if it be true what was stated here this morning, and I do not doubt the statement, that where roads have been properly maintained in the state of Ohio, and some other states, that the value of farms has been raised \$3, \$4, \$5 per acre: under such a favorable circumstance as this, the Tax-payers can well afford to pay their taxes and build the roads.

Now Mr. President, when the proper time shall come, and the question for discussing, "The mode and manner of building these Roads," I shall take the opportunity to give my ideas in relation to the construction of the same. I have travelled thousands of miles over the public highways of this State, and I know the necessity of good Roads, and my advice is "make haste slowly," remembering that "caution is the parent of safety."

J. A. GUNDY, of Union county. I am very glad to say that we have with us a gentleman from Boston, a representative of the National Committee on Rights and Privileges of the League of American Wheelmen—a class of men whose rights you remember were recognized by the Legislature last winter. Mr. George A. Perkins, of Boston, is with us, and we would like to hear from him on this subject.

GEORGE A. PERKINS, Esq., of Boston. Let me say, Mr. President, that in coming here I come representing a body of gentlemen known as the "League of American Wheelmen." This association is composed of thousands of ladies and gentlemen, and the association extends throughout the country. Let me say—and perhaps you will be surprised when I say it—that there are in this country something upwards of a quarter of a million of cyclers, and one of the principal reasons why they have banded together is for the improvement of highways.

Now, this circular that has been handed to me to-day of course is to us great encouragement. It says "A move for better roads." That of course is what we try to encourage.

Now, in all our movements, we have to realize that it has been said, and is said to-day, that we are agitating this question simply from a selfish motive—that is, that we want better roads in order that we may ride to better advantage. Of course to this allegation we must plead guilty. But at the same time, although we are working for our own

benefit, yet I think it can be truly said in every sense of the word that what is for our benefit is for the public good.

Mr. President, I am pleased to say that this large convention here and these able discussions are caused, or have been brought about by the question which, in every sense of the word, emanated from the League of American Wheelmen. This League has spent thousands and thousands of dollars printing literature and publishing articles and collecting facts and figures therefor and public speakers; and to-day we have the satisfaction of having conventions called in other states. In the past week it has been my privilege, in connection with others of the committee, to visit several of the other states. We find that in Maryland the question is being agitated, and that there will be a bill presented to the legislature there. In Virginia, where we would least expect, the question has been taken up, and a bill will be presented this year with a chance of success.

Now, in Massachusetts, in which state of course we started the movement some years ago, bills have been presented, especially last year; but being presented by the wheelmen, of course we were left out. It was called "boys play." But we have secured in Massachusetts legislation that, which I think might be touched upon here—a question directly connected with this subject—guide boards; we have enacted in Massachusetts a law which compels every city and town in that state to erect at the intersection of streets a guide board telling strangers and travelers where to go.

The PRESIDENT. (Gov. Beaver.) That is fifty years old in Pennsylvania—we have been doing that in this state for fifty years right straight along.

Mr. PERKINS. In many respects we admit in Massachusetts that we are behind Pennsylvania.

Mr. MATHER, of Tioga county. I am glad to hear that—that is the first I have heard of it in ten years.

Mr. PERKINS. When I first began to ride, which was something like ten or twelve years ago, it was said we had no rights upon roads. We were obliged to fight, and take a case up to court. We were obliged to have somebody arrested in order to get it before the courts. So that to-day it is known in every state in this Union, and laws have been passed and decisions have been made by the highest courts, which declare that we, as wheelmen, are entitled to just the same privileges as any other travelers. In other words, that our machine is considered a carriage. That has been brought about by the League of American Wheelmen.

Now, when this movement was first started by us we were alone; and for a number of years that was our condition. But we find now we have five states with us, besides different driving associations and carriage builders' associations, as well as the granger associations—but in that respect I speak of my own locality, and the farmers' associations of Massachusetts, New York and Maryland; and I understand this convention represents to a large degree the farmers of this State, so that to-day we are here to say that we are not alone. But we do claim the credit of bringing this question to such a successful stage, and we hope to say end, in the near future.

Now, Mr. President, in a very few words let me say that the League of American Wheelmen, on the seventh day of last December at a convention of its committee, nine gentlemen in number, at New York, decided to press this question, and to ask for legislation in the various

states whose legislatures meet this year. That involves five different states—Massachusetts, New York, Ohio, Maryland and Virginia. The committee saw fit to give instructions relative to the drafting of bills; and it has drawn a bill for the state of New York, which has been introduced into its legislature.

I am pleased to hear that what is in our bill has been substantially endorsed by the gentlemen who have spoken here. That is, in this bill we have asked for a state superintendent of highways; or, as he might be called, a commissioner of highways; one man, who must be a civil engineer, to be paid by the State. He must have his office at the capital; he must collect data and statistics and reports from different parts of the state; prepare maps on which shall be given the roads, giving grades, conditions of soil, etc., and he must have the means at all times required by this bill, to give advice—professional advice—and in addition men, or such officials as you may have here, who have charge of roads. In other words, so far as he is concerned, he is an advisory board. We further provide that the county commission, or county commissioners—I am not sure whether that is what you call your county officials here—that the county commissioners may, from time to time, declare certain roads laid through the counties county roads, by describing the same upon the maps, and recording their taking in the registry of deeds or proper record of the county. That road then would become a trunk road—it would be known as a main road, and from that time must be maintained by the county, and at the county expense. The county commissioners we provide may employ suitable engineers at the county expense. We also provide for the raising of the tax. We further make a provision here, which has been touched upon by one of the gentlemen, for the abolition of the working out of the tax upon the roads—in other words, that all road repairs and construction must be done by contract.

This, Mr President, is the bill that has been presented in the legislature of New York. It will be discussed by the body there, probably in a very short time.

Now, I wish, in the name of the League, to say that there is no official in this country whom the League of American Wheelmen more appreciate than his Excellency, Governor Beaver, of Pennsylvania! In all our literature and circulars we cite him as our best friend! He was the one who started this officially as Governor, and of course he is cited. And I can say truly that his name is a by-word among cyclists.

The PRESIDENT. (Governor Beaver.) I certainly cannot be charged with any selfishness in that matter, because, as you all know, I cannot ride a bicycle! (Loud laughter and applause, which was augmented by the fact that the Governor is a one-legged man, having lost the other member on the field of battle during the war.)

Mr. JOEL A. HERR, of Clinton county. Mr. President: I have now the views of Col. Young, on this subject, that I am requested to read.

"The subject under discussion is one of great moment to the farmer of Pennsylvania, and much of the State's welfare depends upon good roads, and their being properly kept up. For many years it has been a much disputed question how public roads should be maintained and kept in proper repair. Very learned arguments have been made from many points of observation, though much has also been said from mere theory, and not a little without any practical basis whatever. Some have advocated that each land owner should keep in repair the road in

front of or abutting his own property. Some have urged that county officers should be appointed, or elected, to take care of all the roads within the county's jurisdiction, and be paid directly from the county treasury; while others have gone to the opposite extreme, and held that the only proper way is for each tax-payer to work out his road tax, some forgetting to add whether or not under proper supervision. Others have advocated a special road fund, to be replenished from time to time by special road taxes; and there has been almost every variation of idea, and every point of theory suggested without lasting good being accomplished. To-day in Pennsylvania, as a rule, we have such poor roads, and there has been so much complaint in connection with them, that it has been deemed advisable to set apart hours of valuable time to discuss the subject by this State Board. His Excellency has given the subject much thought, and no doubt matured feasible plans for remedying the difficulty.

But is there not a practical way out of the embarrassment not yet broached? We have many poor townships, and farmers in them so poor that it is a daily struggle to raise and save enough to keep them from want. Their taxes now seem oppressive to them—they claim, if more are to follow, bankruptcy is certain. On the other hand we have a wealthy and powerful Commonwealth, with a plethoric treasury, and ever increasing income. Probably no State in the Union is better off financially than ours. Could not the Commonwealth and the farmer tax-payer join hands in this way: The farmer not to have his road tax burden increased, especially in localities where he is now driven nearly to the wall; but instead the Commonwealth to extend a helping hand by liberal appropriations for road purposes. Many a township with such aid could soon have its roads in first class condition; and once in that state, it is an easy matter to maintain the condition desired. On the other hand, the money thus appropriated would be for the public good—for everybody has a right to travel the public road, and everybody within the borders of the Commonwealth is benefited by good, well kept highways. Our State would not only be helping the noble work by thus coming to the aid of every township, but she in return would become wealthier by the increased prosperity and thrift which would be manifested on every hand."

The PRESIDENT (Governor Beaver.) We have represented on the floor of the assembly to-day the Society of Engineers of the city of Pittsburgh, who have given this subject very considerable attention. I have noticed Col. Roberts, who is one of the representatives of that city, endeavoring to get the floor several times. I am very sure we would be glad to hear from him. Mr. Arthur Kirk is also a representative of that society.

Col. G. E. ROBERTS. Mr. President: I wish to make a few corrections in regard to the city of Pittsburgh. I am here as a representative of the Pittsburgh Chamber of Commerce. I am also a member of that society; but they happen to have a delegate who is a very good speaker, Mr. James B. Scott, who is the chairman of the Committee on Transportation and Railroads. But at the last moment I learned he was not able to come. I will do the best I can to represent him, although I know he could do much better.

I believe I am representing the prevalent opinion in Allegheny county in the assertion, that the days of mud roads in this Commonwealth should be terminated as speedily as possible. I think the view has been too long entertained that the country people should look after their own roads, and not ask the people of the cities and boroughs to

help to improve them. What are country roads for if not to reach, directly or indirectly, the cities and boroughs? So, therefore, there must be common interests involved in the determination of the question we have before us. We were advised to "go slow in this matter." We have been going slowly I think the past fifty years. We in the cities have waited a hundred or more years for the farmers to do this work without our assistance; but we see as the years go around less disposition shown by the farmers to undertake the work, for the simple reason that their ability to do it is growing less and less. Now it makes not a particle of difference to the farmer how poor he is, he still remains independent—he never begs. He can stay at home in the mud all winter and no matter how many eggs spoil (laughter) on his hands, he can afford to wait for the opening of the spring, for he cannot be starved out. He may not, after a bad winter, be able to buy as many goods; but he has not suffered as much as the townspeople, whose wages, no matter how big they may be, have all gone for high priced butter and eggs, or for Western baled hay, oats and grain.

In Pennsylvania the mass of the population is living, so to speak, in a hand-to-mouth manner, on account, chiefly, of the fluctuating prices of the necessities of life. So far as the aggregate wealth of separate classes of the community is concerned, the dwellers of cities have an advantage, because they have the aid of railroads in equalizing values. But while values of products may be to a great extent equalized throughout the country by means of the railroads, we may still all suffer together on a too high basis of equalization. The Western States are, however, with their railroads paralleling each other at frequent intervals, better for farmers than Pennsylvania; but we can never, in our mountainous State, hope to see such a liberal system of railroad distribution as is witnessed in the West, and therefore we must more largely depend upon improving our highways, if we expect to redeem the thousands of acres of good land in Pennsylvania which have never been stirred by a plow, or the vastly greater areas which have been farmed just enough to keep together the bodies and souls of our poorer class of farmers.

I have traveled through many counties of this State, and my observation is in entire harmony with that of many other observers, that as compared with the development of the mineral and manufacturing interests of the grand old Commonwealth, its agricultural interests are at a complete stand still. Each year finds us less and less able to supply our own wants. In other words, with increase of population we have a less home-raised food supply per capita. It would look as if the old State was worn out and could not supply the wants of its people; but such a view would be very far from the truth.

Several years ago I had occasion to make some surveys in Kentucky. I had heard something of the fine roads traversing the blue grass region, but was not prepared to find them of the high standard at which they are maintained. In the sixteen small counties which form the blue grass region I was informed there were fully 4,000 miles of macadamized roads, all fully equal to the 200 miles over which I drove in various directions between Georgetown, Paris, Winchester, Lexington and Frankfort. I was surprised beyond measure at the ease and comfort with which we traveled from place to place—highways and by-ways—all the same good roads. There I learned that the richer people lived in the country, and the poorer people in the towns, and there I learned the secret of the pleasures of country life, not for the summer months, but

for all the year around. The secret was good roads and good horses. Kentucky would never have developed its fine stock of horses without those roads.

The PRESIDENT. (Gov. Beaver.) Good roads lead to good horses very largely.

Col. ROBERTS. Throughout my travels in that State, I did not see one of those horrible machines, viz.: a road scraper, and yet last year they sold of surplus horses \$2,000,000 worth. I think it would be a mistake to consider that this was the product of blue grass. Blue grass, *per se*, is a good thing as far as it goes; but as a crop food far more expensive, I should think, than timothy. It is not the feed that makes the horse, any more than it makes the man, but breeding and training count in both cases alike. Pennsylvania need never hope to compete with the Kentucky farmer in horse flesh so long as we tolerate the roads we have. There is enough alone on horse talk to warrant a radical improvement of the system under which we labor; but as I am not prepared to talk it, I will pass the subject, although I do think it should appeal to our farmers especially, as the most conclusive and self-evident argument in favor of good roads.

We are, in Pennsylvania, all in the mud together. Even in Allegheny, by no means the poorest county in the State, we have the mud grip as badly as the worst of them.

Not long ago there was a fire in the suburbs of Pittsburgh, and although the dwelling, I am told, was surrounded by fire alarm boxes, fire engines, hooks and ladders' &c., it was suffered to burn to the ground because the engines could not go through the mud to reach it. Not even a line of hose could be carried to the place.

We have a borough of 30,000 inhabitants, called McKeesport, in our county, and another called Braddock, of 15,000. These places are only a few miles apart, and at the farthest by the winding of the railroad along the Monongahela River, McKeesport is about thirteen miles. But directly across the country by the "mudpike," the "wallow-wallow, air line route," the distance is variously estimated at from thirty to ninety-five miles. Just at present I think the distance is at its maximum.

We have by the report of our county engineers about 2,000 statute miles of such roads in Allegheny county, and our people have at last been awakened to the necessity of improving them. But we are told that nothing can be done until some legislative action has been taken. Pittsburgh and Allegheny city have no right to compel the township people to do anything, even if the cities offer to assist them in improving the roads.

Mr. ALEXANDER DEMPSTER. Mr President: This subject is taking a wide range very early—to horse raising and grain raising, &c. I think, however, we are leaving the point at which we should focus our attention and our energies. It is the production of the means—providing the ways and means by which the roads can be made.

So far as intelligence and engineering ability in Pennsylvania are concerned, you can depend upon it that the talent is in the State to make the roads if the means are provided. Now, how are these means to be provided? They must come from the people. And in accordance with the remark that was made this morning, except you can reach them and educate them, they will never live up to the laws that are enacted—and I do not believe you will get the laws enacted.

How shall this be done? There are many ways. I do not know that I can do any better than read what the committee of our society—the Engineers' Society of Western Pennsylvania—prepared hastily on the subject before the adjournment of the Legislature, in the hope that their knowledge might receive some attention, and not be classified as N. G. But as it is, it stands in doubt yet.

Now highways, according to their importance may be classified in three divisions—highways, roads, and lanes; but the highways are to be decided by the county engineer. You might say at least that there is to be a county engineer provided in each county—an engineer of at least five years' practical experience; and that the county commissioners, elected by the people, shall have charge of the county roads. Now, these highways are to be termed as has been said by some one, county roads; and the roads say, technically, would be those highways that are now township roads, and entirely within the township, and connected with these highways. As the proposed law reads, "it shall be the duty of the court of common pleas of the respective counties within this Commonwealth, to appoint a board of four persons, who, with the county engineer or surveyor, shall be constituted a commission to classify all the thoroughfares in the county, not included within corporate boundary lines, and to divide the same into three classes, to be styled, respectively, highways, roads and lanes. Highways shall include all those radiating from the county seat to other populous points in the county, or to the boundary lines of the county, and those connecting such other populous points; or those which by reason of their connection and extension in the same general direction, afford a continuous line of travel between such centres or to such boundary lines."

In harmony with your recommendation, that those leading thoroughfares that lead from county seats to other important towns in adjoining counties should be carried through as State roads. But the expense should be borne partly by the county and partly by the State, as we shall see hereafter.

Then there is a section that within thirty days after the passage of the act the court shall make the appointment provided for, and persons so appointed to meet at the county seats of their respective counties and organize—but it is not necessary that I should read it. Then in each township three road directors to be elected, one annually, to serve for three years, such directors to have been citizens of the county three years before their election, and freeholders in such township, and in case of vacancy the court of common pleas shall appoint. The road directors are required to meet on the second Tuesday in March of each year, and to levy a tax of not more than seven and one-half mills on each dollar of the valuation made by the township assessors for county purposes, the same to be collected by the county treasurer, and to be set apart and kept as a road fund, "which shall be paid out by him, on requisition of the county engineer, duly approved by the president and secretary of the road directors." This for the improvement of the township road or roads.

"The road directors, in conjunction with the county engineer appointed as hereinafter provided, or his deputy or assistant, shall divide the township into road districts, and determine the prices to be paid per day for labor, the amounts to be expended in repairs and in permanent improvements during the year, and the amount to be expended in procuring materials, tools, or machinery deemed necessary to macadamize or otherwise improve the road; provided, however, that not less

than thirty per cent. of the road tax collected in each year shall be expended for materials to macadamize or otherwise improve in a permanent manner." That is, that some of that fund shall be expended in the permanent improvement, and not merely in the repair of roads, so that after a while there will be several lines of good road made.

"The road directors, in conjunction with the county engineer, his deputy or assistant, shall have power to locate and open new roads, vacate existing roads, or change the location of the same, upon the petition of not less than six taxpayers of the township in which the road is located, whenever they, or a majority of them, shall deem it necessary for the convenience or safety of public travel so to do."

And here follows how they shall do it; and then the engineer of that board especially is limited in his sphere what he shall do in that; and the first point in the location of that road is its gradient. All ought to know that the load a man takes to mill is limited by the steepness of any one hill on that road. If a team can haul a full ton along a portion of that road, and there is an intervening space where there comes in a half a ton, then that half a ton is the limit of his load, and the rest is wasted. So that an engineer, in order to succumb, say three degrees in a road, shall be governed, first, by the ease of gradient; second, by directness of alignment; and third, by least amount of damage consistent with public utility. We think these elements are required to prevent the engineer from being biased too strongly by the local influence around him.

Then there shall be constituted, first, a board of viewers who shall go on and perform the duties that are devolving upon them in that way.

"It shall be the duty of the county commissioners to take cognizance of the classification so made, and to levy an annual highway tax on all property in the county not exceeding seven and one half mills on each dollar of valuation made for county purposes." That is just put in to name a figure. "Said tax shall be collectible by the county treasurer as other county taxes are collected, and be paid out as hereinafter provided."

"The county treasurer shall set aside seven and one half per centum of all taxes collected in the county for State purposes." Here is where we expect to get a little fund out of the State. Now, the State is drawing a little fund out of the county in this three mill tax; and it could be extended by the commission, of which Mr. McCargo is a member, so that the burden shall be apportioned to all classes of the citizens. This tax, collected in the county for State purposes, "together with the highway tax levied and collected as aforesaid, shall constitute a highway fund to be applied to the permanent improvement and repair of the highways so designated, and all bridges constituting parts of such highways. Said fund is to be paid out on requisition of the county engineer as hereinafter provided."

Then it goes on—and it is not necessary to read it all—but the rule is laid down that the principal officer of the county shall be a civil engineer of at least ten years' practical experience; and, to relieve him from all political influence, or from all bias that might surround him by having him elected, it is provided that he shall be appointed by the court of common pleas of the county. Thus he would be relieved from any local prejudice. And I think it would be very well to have one at the head of the engineering in the State, so as to have a head in all the counties and each county to be provided with an engineer through the courts, and not building a State structure that would be liable to

degenerate into a political structure; and we can depend upon our courts to appoint the best men. We have that law now to some extent. Our courts appoint a county engineer, and that county engineer has charge of construction in that county, except the maintenance of roads. He built our court-house, with two millions and a quarter expended; and he is charged with all the county structures, and all bridges and buildings, but has charge of no roads; but our roads are under the management of the old *regime* which, under the law, we wish abolished.

It is the people who pay the taxes that must be reached; and you, gentlemen of the legislature and of this commission, can provide a beneficial law which will be accepted and maintained by the people and which will be effective, and that shall be best sustained where they want to have the best roads.

Now, if we reach the people, and allow them to have some say in accordance with the line that has been laid down in this report of ours, we think they will become educated. Our friend from Philadelphia has said that ways have been provided for everybody but the farmer; and the reason is that he does not provide for himself. You all know it is hard to get notions out of the farmer; and you have to educate people so as to show them that by paying out a certain amount of money they will be benefited. The point of this fact has been brought out in Ohio by the expenditure of money advancing the value of land. You must show the farmer whether it will pay. It pays down in Kentucky to raise horses; and whatever pays, when once realized, satisfies our farmer friends.

Now, what will be the beneficial effect to the whole country? We all know that if the whole of the country produce must be gotten to market, it must be done by good roads; and, so far as the personal construction of the roads is concerned, it would be well if you could only provide the means. But you will find a prejudice if you undertake to legislate or undertake to expend money without representation. You know that is a great fallacy of the American citizen. But by beginning at the township, and constituting road directors—by getting men who are free-holders and intelligent men—and putting the whole construction under the management of the county engineer, who shall employ a practical road man, and of practical knowledge, to have supervision and direction over all the roads in the township, and that the county engineer shall make the specifications, and act with the county commissioners for the purpose of maintaining and constructing the highways and bridges through the county—and where each county does that under the direction of a head here in Harrisburg, which shall conduce to uniformity throughout the whole State—then we shall have highways not enjoyed by any county; and we shall have what we have never had in Pennsylvania, or any where else, a law that the gradient shall rule the location of the road; and we shall have roads that we can travel and take produce to market from the time we leave home of such a uniformity that we can know what loads to take, and take the maximum loads that the teams can draw.

Now that has been the idea of the Society of Engineers of Western Pennsylvania, and not only the engineers, but the best men financially; and men interested in everything done for the protection of the welfare of the people and all classes, are members of that society; and it is a society that represents the people of Pittsburgh as much as does, I think, the Chamber of Commerce, who I think have also representatives here, but we are all a unit on that point, and there is no diversity

of sentiment. The point is, how to provide for means making good roads, and how to apply them. The application will be ample, if the means are provided.

The Board then took a recess till 2 o'clock.

Board called to order at 2.13 P. M. by Vice-president McDowell, of Washington, in the chair.

Secretary EDGE. Mr. President: According to our published programme, the first business for this session would be the reading of an essay on "The durability and economy of McAdam structure" by Samuel R. Downing, member of the Board; Mr. Downing is unable to attend on account of illness, but his essay will be read by Mr. Herr, of Clinton. I noticed at the close of this morning's session that a number had failed in attempts to get the floor for an expression of their opinion on the question of the road laws of the State; I would therefore move that the question be continued for a short time longer, and that Mr. Searle, member from Susquehanna, now have the floor, to be followed by such others as may wish to express their opinions. I would also suggest that as this is innovation is a privileged one, any member may, very properly, call for the regular order of business at any time.

Vice-President McDOWELL. The chair hears no objection and the suggestion is therefore adopted, and the board will be glad to hear from Mr. Searle.

R. S. SEARLE, of Susquehanna. The remarks of his Excellency this morning were pertinent and to the point. He is in earnest, and means what he says. He would like to inaugurate and help carry out this movement. The remarks of my friend from Wayne county (Mr. Underwood) were most admirable. What he said comes from the people; it is the result of his intercourse with the tax-payer of Wayne county. It comes from a long experience in the making and maintaining of roads. He knew what he was saying. I think he offers some matured suggestions that are well worthy the consideration of the commission who have in charge the formulating of a bill to be presented at the next session of the Legislature. The same may be said of Mr. Gundy's remarks, which were just to the point, and reflect, I may say, the sentiment of Union county; and not only of Union county, but a large portion of the State in regard to this subject.

I listened with interest to the remarks of the gentleman from Philadelphia, who first spoke. He evidently is in earnest upon this subject, and he means what he says, and represents the sentiments of those men who have issued this circular.

An intelligent consideration of the road question involves the study of our whole system of taxation, and will demand an equality of cost on every dollar of property of all kinds in the State, after we have convinced the people of the absolute necessity of better roads, better laws, and things of that kind. And the original question comes back to the ways and means, and who shall pay this? We have been paying for a long time—the farmers—I am speaking from a farmer's standpoint—we have been paying an undue share of the burdens of Government in the way of taxation, and now better methods involve an additional expense, and how is that to be raised? It must be raised from the property of the State. Every improvement made upon your roads must take money raised by the labor of some citizen in the State, or it must be taken from the accumulation of those who have large amounts of ready money.

Now, it was with great pleasure that I heard Professor Haupt say that the large corporations of this State, and there were mentioned the Pennsylvania Railroad Company and the Philadelphia and Reading Railroad Company, and other corporations,—that the moneyed men, and those who had large means, were prepared to unite with the citizens—the farmers of the State, in bearing their equal share of taxation to bring this about. He did not use these very words, but it was intended that way. If that is true, my friends, they have gone very far on the road to success in this movement; and I say, with my knowledge of the immense amount of property in the State that has never paid one cent of road tax so far, levied as it has been upon our farm property—in view of that immense amount of property that now escapes all taxation for road purposes—if they are willing to put that in the common fund, and make an equality of taxation on every dollar of the wealth of the State, so that each dollar shall bear its equal burden, it would be but a small thing for us to go on and raise money enough to make these improvements as the years go by.

Our roads to-day are not as good as they were fifty years ago in our section of country. When I was a little boy, and my father kept in repair the turnpike over which the stage made the great run from the edge of the west bank of the Delaware to the New York State line, at first we had a magnificent turnpike which we could travel over; but now that is hardly more than a by-path.

There is another thing that my friend from the western part of the State, Mr Mantor, seemed to consider a great bugbear, and that is that we must not touch the funds or ask for any assistance from the State. Now what is this great State treasury, if it is anything different in reality from our county treasuries? Are we not citizens of one common Commonwealth? Are not the funds raised for the support of any of the rest of the citizens of the Commonwealth than those directly connected with the affairs of Government? If there were to be a surplus in the treasury of the State unexpended, and likely to remain unexpended, what is the harm of employing a portion of it for the maintenance and building of new and better roads? The lawyers are all guided by precedent. Our country up there was largely developed by means of State aid. The old State road that runs from the Delaware river through the northern lines of counties was built almost exclusively by State aid, and that tended to bring out and settle that portion of Pennsylvania, with its present vast resources. Our turnpikes were largely built by State aid, and I find that whenever a great reform of this kind has been brought about, it was necessary to have State aid. I need only refer to that great artery of commerce, the Pennsylvania railroad, which was made possible by the expenditures of the State originally. I only mention these facts to show that we have a right to State aid.

I can readily see, in the consideration of this question, the absolute necessity of cheap and speedy transportation from the great centers of trade, and the manufacturing and the mining industries. It is absolutely necessary to conduct them; but the farming class live along as they have in the past years, without expending much more money than they have been doing. So you see that it will become imperative for these great centers of trade, and these great men, in order to get better means of communication, to put their shoulders to the wheel and help this work along. I only mention this to bolster up the great weight of burden. When the great cities of Philadelphia and Pittsburgh, and other centers of trade in this State, shall send representatives to this

House, and to the other house, who will recognize the principle of the equality of taxation, and will not stand in the way of the enforcement of the provisions of the constitution of 1874, but will carry them out in good faith—already shared, I believe in my heart, by the rural population—the farmers and the artisans, with their little homesteads, that are now bearing such an immense proportion of the taxes unjustly, will join hands with them, and heartily be of one accord to assist them in carrying out this much needed reform, which will be of so much benefit to you all. Thanking you for your indulgence, and adding that I only make these few true remarks from thoughts that occurred as the discussion went along, I thought I would offer them as reflecting the people's ideas of those things in my county, where we have discussed this road question—and when it was brought up at our institute we had a paper read there on this subject by Mr. Downing, and we discussed it; and it at once brought up this subject, among the people, of taxation, and we talked it over. That is the reason for my presenting these few words upon the subject of taxation.

It was moved by Mr. UNDERWOOD, seconded by Mr. REEDER, that the programme for the afternoon be taken up—Road Construction and Repairs, agreed to.

Vice-President JOHN McDOWELL. The first essay is on "The Durability and Economy of Macadam Structures," by Samuel R. Downing, member at large, from Chester county, to be delivered and read by Mr. Herr, of Clinton

THE DURABILITY AND ECONOMY OF MACADAM ROADS.

By S. R. DOWNING, *Member of the Board, West Chester.*

A not very ready musician knows how tiresome it may be to compass a new tune and how easy to lapse into the old airs. And so with new ideas, policies or economies. The old idea is cherished, fondled and embraced until there is jealousy of the new.

Thus when an essayist points out that a macadam road is *not a pike*, that a macadam can be built for less than pikes have cost, that a macadam costs less for repair and that it is the most economic road, some very good people will not so much as wrestle with the new saying, but, clinging to the old ideal, will argue that inasmuch as pikes are rough, macadams must be rough; inasmuch as pikes are built below frost, macadams must be so built; that inasmuch as the hand-hammered pike has cost as much as \$5,000 per mile, and because of its coarse construction a \$100 per mile, annually, for repair, that consequently a machine, crusher, roller-made macadam structure must cost the same (\$5,000 per mile) for the making, and the same (\$100 per mile) for annual repair.

However unhappy the essayist, arguing for better things, may be over this annoying incident, he must be patient under the knowledge that new principles, however beneficent, have never as yet been totally welcome and have ever as yet met with a measure of opposition. He may be hopeful, however, under the lesson that opposition to that which is good dwindles and disappears before honest argument and fair experiment.

It is so easy to assert regardless of proof, so easy to believe bald assertion when within the line of the wish that is father to our thought, that I invite you, regardless of wish or personal pride of opinion, in a free and friendly way, to watch that my plea for the macadam system is fully warranted and supported by more than simple assertion.

It is becoming usual to call pikes macadamized roads. A macadam road is not a pike in that the macadam is infinitely better and less expensive roads heretofore called pikes.

The imperfections of a pike are:

First. In that it is composed of loose stone in its making and repairing. Thus the pressure a pike receives from passing wheels deepens into ruts. A rut once made, although filled and refilled, will appear.

Second. Pikes have been constructed of hammered stone. Hammered stone is too coarse for the best superstructure of roads. The originator of the macadam principle, stated before a committee of the House of Commons, that a stone road was saving of repair in ratio with the fineness of the stone used. Thus a bed of one-inch stone would cost in repair of such bed but one-half of that of a bed of two-inch stone.

Again, a pike composed of hand-broken stone may have cost \$5000 per mile for building, and \$100 per mile, annually, for repair—\$5,000 per mile for building, because the stone was hand-broken, at probably one dollar per perch, and \$100, annually, for repair, because the superstructure was coarse and loose. Thus ruts are started and are expensive to erase. The experience of macadam builders teaches that a rut will follow a rut, that is, if a stone bed is laid upon a rutted clay base ruts will appear in the stone bed directly over those of the clay foundation. Thus one rut in a pike is the predecessor of an endless series of ruts and an endless bill of costs.

On the other hand, a macadam structure avoids these imperfections of a pike in that (first) its superstructure is composed of small stone and stone siftings or chips, and (second) while wheels press the unknitted, loose surface of a pike, and reach solidity within one track at two inches below the general surface, thus forming ruts, the roller used in macadam structure does exactly what wheels do, but further, it presses the entire surface of the bed, so far as wheels can penetrate, in ruts, and thus makes the entire bed as solid as the base of a rut. Thus again, a macadam is so uniformly resistant of wheel pressure that ruts cannot be produced in some macadam within a period probably of ten years.

A crusher turning out eighty perches of stone per day will earn in a day at fifteen cents per perch \$12.00, which will easily pay for the cost of running a crusher per day. The difference between one dollar per perch or hand-broken stone and fifteen cents for crushed stone is eighty-five cents. In the realization of this gain of eighty-five cents by use of a crusher, we can reasonably conclude that a macadam ought to be built for less than half the cost of hammered pikes.

Then again, as to the economy of a macadam over that of a pike. A macadam being virtually rut and water-proof, and continuing so for ten years, what will it cost to repair a macadam per mile, annually, during ten years? I think you will reply, really nothing.

But will a macadam resist wheel pressure for say ten years? In answer we are furnished proof in an eighth-year-old macadam leading from the P. R. R. freight and passenger station, at Devon, Chester county. Mr. Chas. Paiste, Superintendent for the Devon Land Company, tells me that this macadam has endured all the traffic from the railroad, being equal at times to two tons at a draft, and yet this mac-

adam has not cost a cent for repair for eight years, and, I saw for myself, has not as yet a rut. The question then arises, this macadam being as good to-day as it was eight years ago, will it not endure eight years more without a cent for repair?

I do not wish to incite a dangerous conclusion by saying that a macadam will be impenetrable for ten years under the passing of unusually heavy crowded traffic. The Lancaster pike has been splendidly macadamized between Berwyn and Philadelphia for six years. The macadam holds its surface under more travel than will traverse an ordinary country road until it approaches Philadelphia, where a very heavy traffic centers upon it and the surface has broken somewhat into ruts. It would be unfair, however, to cite this as an instance that under ordinary travel a macadam will rut within ten years.

There is another point as to the saving of macadam worthy of honest consideration, notwithstanding the idea is new and apparently susceptible of doubt.

The argument is offered that if a bed of stone is less than twelve inches thick, wheels may cut through the lesser thickness and plow up the earth. We find, however, ordinarily, that wheels do not penetrate a loose bed of stone over three inches. If, then, a loose bed must be twelve inches, a macadam, saving three inches, need not be more than nine inches thick. But even now loose stone beds are laid but ten inches.

If, then, a total hard pan can be made with a six-inch thickness of stone bound by two inches of stone chippings from the crusher, why a ten inch thickness?

If you will accept my evidence that a genuine macadam will not rut within ten years, then there can be no retention of water and thus little action of frost. Then, too, a clay foundation being arched, gives the strength of an arch to the interlocked compact solidity of the macadam bed. Thus a stone compact well arched will again save in material over a flat, loose bed.

Therefore, by reason of the evidence I have submitted as to the cost and saving of macadam structure, I wish to appeal from any impulsive figuring as to macadam roads based upon pikes and costing \$5,000 per mile and \$200 and \$300 for annual repair.

There may be in every township roads of sand loam that cost but ten dollars annually for repairs. It is not fair, again, to make the cost of maintaining such roads the criterion of the cost of maintaining the most traveled and worse clay roads. If the average cost of the dirt roads of a township is, annually, say forty dollars per mile, the lighter sand roads costing but ten dollars, the worst roads or worst parts of roads must cost, in addition to the average of forty dollars, the difference between ten dollars and forty dollars, making, with the difference of thirty dollars added to the average of forty dollars, the total cost of seventy dollars for the yearly repair per mile of the worst roads, or the worst parts of clay roads.

A crusher, truck, belting and roller will cost \$1,200. A threshing engine can be hired and coaled for seven dollars per day, while the wages of three men will not cost over five dollars, making in all twelve dollars. Four townships can pool and own this machinery at a cost of \$300 per township.

If a township owns two horses and carts, one teamster, at one dollar per day, and two teams at a cost of horse feed per day, one dollar, they can haul twenty perches per day, one-fourth of a mile on an average,

and this for ten cents per perch. Thus if we sum up fifteen cents for crushing, twenty cents for the double haul to and from the crusher, twenty-five cents for breaking or quarrying, twenty cents for rolling, we have eighty cents, and the warrant to name one dollar as the cost per perch of a macadam road. The crusher being portable and stone plenty, we may leave out the quarrying and one haul, reducing the cost per perch to say fifty cents. A road ten feet wide and six inches thick, at fifty cents a perch, would cost \$533 per mile.

The people of some townships are favoring this ten-foot wide and six-inch thick road, for the reason that a ten-foot road abutting against one bank will leave room for a summer road. The summer road being more yielding than the macadam, will be used during the summer, or for six months, to the saving of the macadam, while in dry weather the summer road will *not* rut, and the wear can be repaired at little cost.

Now, a road of ten feet width, six inches thick where quarrying and two hauls are unavoidable, will cost per mile, at a dollar per perch, \$1,066. If, then, we save on our worst roads—which, of course, we only macadamize—the average of seventy dollars per mile, the saving alone on a mile or ten miles of dirt road will pay for a mile or ten miles of macadam in fifteen years. Should we save annually per mile seventy dollars by macadam structure, from ten miles we would save \$700, and in ten years we would save \$7000.

It actually seems a blind conception of economy to give to waste, in name of saving, \$7000, rather than place this \$7000 where the principal can be realized in the appreciated value of farms: where the principal will double, triple and quadruple itself, as time passes on, and where such principal can earn a large dividend in the savings from road repair, speed and draft.

Another unaccountable trait of our business character is that we will pay seven per cent. for the use of a pike in tolls, and probably three per cent. in addition for its maintenance, when we could, by a simple operation that a child will understand, turn this seven per cent. into our pockets, instead of giving it to others and saying how hard the times are.

There is not time for me to illustrate the saving of macadam roads in speed and draft. In all our journeying to the railroad station, to mill, to school with the children, to the town market, to church and post office, there is time and draft expended during the coldest days and roughest roads of the year. This if you will demonstrate with your own pencil, will equal easily two mills on the assessed valuation of your township. And we should remember that these journeyings do not end with a decade.

In order to secure quick returns from the substitution of economic macadam for wasteful dirt roads, we must have capital. A county or township loan would undoubtedly increase the lien on our farms for a time; but my farms in East Goshen, and those also of Captain Roberts, are already obligated for a share of the lien, virtually so, of \$1,400, for the repair thus far in the year of twenty miles of dirt roads in our township, and although some of these roads are now a series of bogs and the money wasted, that \$1,400 must be paid. Otherwise there will follow a constable's sale. Now the building of ten miles of macadam, after the macadam earned its cost, would reduce this lien from \$1,400 easily to \$700, and the loan of capital would be the agency effecting the reduction of the present lien.

What would be the lien per acre for capital furnished for building ten miles of ten feet six-inch wide road?

Our State includes three thousand districts. There being sixty-seven counties, the average number of districts would be forty-five, without fractions.

Ten miles of macadam road per district would make four hundred and fifty miles per county. Four hundred and fifty miles, say at \$1,000 per mile, would be \$450,000 for the county. As our county taxable property value equals an average of \$23,000,000, \$450,000 for four hundred and fifty miles of macadam road in the county would be about two per cent. of \$23,000,000.

Now a hundred-acre farm costing eighty dollars per acre would equal a value of \$8,000. The lien, therefore, on this farm of one hundred acres for the ten miles of township macadam would be two per cent. of \$8,000, or \$160 for the one hundred acres, or \$1.60 per acre.

Farmers are continually giving ninety-day liens of \$160 for horses that may die before the notes become due. Is it more distressing to give a lien of \$160 for ten miles of macadam that will be a blessing to generations in those summers that you and I will never see, and that will be of part of the most revered remembrance of the spirit and beneficence of our generation?

"But," says A to B, "your farm being along the macadam will appreciate in value more than mine, which is distant from the improvement, and thus I should pay less tax." Of course, if the farm skirting the improvement increases in value, it follows that it will be assessed higher, and the owner must pay more tax, not only for roads but for school and county expenses. Judge Lawrence, of Ohio, says that since the adoption by that State of the free pike act, farms adjoining permanent roads, made under this act, have increased in value twenty per cent., *because* the demand for farms is centered on these all-the-year-round roads.

But, then, this free pike act, without any cognizance of this surety of increased value, provides that owners of farms adjoining the improvement shall pay an additional tax of two dollars per lineal acre within one mile of the improvement, and that owners within two miles shall pay one dollar per lineal acre. The county furnishes the capital and the improvement is made upon appeal to the courts by three-fourths of the number of residents within two miles. This law evidently settles the matter of diverse values, but seems to place the burthen upon a few enterprising citizens, and yet these citizens have a consideration in increased values. If, however, the entire citizenship should appeal for an entire macadam, in such case the burthen would be equal.

Now, what would be the cost under the Ohio system to the owner of a hundred acres, square upon the improvement, for a road costing \$1,000 per mile? There would be ten lineal acres for one hundred acres, which, at two dollars per acre, would produce an annual tax of twenty dollars. There are twenty five lineal acres per mile. This, multiplied by six dollars as tax received from both sides of the road, would produce an annual sum of \$150 per mile. In seven years the amount of these sums would equal the price of the road, or a thousand and fifty dollars. The owner of a hundred acres within one mile, paying twenty dollars, annually, would pay in seven years \$140 as his share for the building of the mile of road. This product is twenty dollars lower than our estimate, based upon average valuation.

Thus a natty macadam track, costing a thousand and sixty-six dol-

lars per mile, by use of crusher and roller, can be built, interest included, by the adjoining one hundred acres owners simply handing over an eight year note for \$160 within one mile, and eighty dollars within two miles.

Or a ten feet nine-inch thick road can be built at one dollar per perch for \$1,600 a mile, or at a cost to adjoining owners of one hundred acres within one mile of \$260, or within two miles of \$130, interest included.

Of course the popular verdict may be for the nine-inch thickness of full stone or the six-inch depth of stone, bound by two-inch surface of chippings. But some may say that a nine-inch thickness is still insufficient, yet with a nine-inch thickness twelve inches can be placed on flats and six-inches on slopes. The streets of our town of West Chester are but ten inches, and this for a borough population of 8,000 and virtually for an entire population of a county.

A nine-inch thick and twelve feet wide road would cost at one dollar per perch \$1,920. The period of payment of cost and interest would be sixteen years under the Ohio act, thus the owner within one mile paying yearly twenty dollars would pay in sixteen years \$320 dollars and the owner within two miles \$160. I have calculated upon the Ohio basis because it is truer and more definite than the general average basis.

The people of townships very reasonably think that the people of the towns and that corporate and personal property should share the burthen of township road structure, and this because that trade centers in towns, as is evidenced by the fact that when town trade falls off such falling off is the result of boys' decreasing access to towns. True, boroughs pay the cost of streets, but country folks mainly use the borough streets in business errands that are profitable to the merchant, lawyer, doctor, mechanic and banks of the town. On the other hand, when merchants and other business or leisurely folk of the town drive through the townships there is no monied errand favorable to the farmer however gladly the farmer may see them driving by.

Again good public roads being in the same line of importance to the State as are common schools, needing like incentive and policy, the State should be generous in their behalf. This for the same and universally accepted reason upon which our national Government fosters, facilitates and protects the traffic of rivers and harbors.

We can remember and instance, if we will, certain stretches of clay roads largely traveled and almost impassable during two months of each year, and this, notwithstanding the use of the best skill that can be secured in a Supervisor, notwithstanding the road scraper and the May rounding-up. In fact it is impossible to make such a road a jot less than a nuisance in March and April. While it is heaving and freezing and becoming fathomless with quicksands, the pick, the shovel, the scraper, the skill of the Supervisor, no clay road law of Pennsylvania can touch it. The Courts may declare it a nuisance and still it is a bog. The disease must annually run its period. Plenty of good-natured advisers say that the action of the frosts and rains of February, March and April can really be stopped by a rounding-up in the fall. This seems equal to catching a bird by putting salt on its tail. But even should the fall rounding-up remedy stop the action of March frosts it seems that a large citizenship would have to be regenerated in order to secure consent to the extra expense of this fall rounding-up, and legislation cannot regenerate any body; even if there are plenty of liberal township people, and I know there are, they would still doubt as

to a fall rounding-up being master over the mischievous elements of a winter. Thus legislating for an entirety of all-the-year-'round roads upon a basis of clay seems like blowing a feather against an equinoxial wind.

The township simply will do nothing, though the opportunity is at hand by the macadamizing of these bogs, to save thousands of dollars and to enjoy the comfort of easy, safe travel, because A does not want to pay for B's macadam, C is wary of increased taxation, D is opposed to borrowing capital and E plows through the mire because forsooth thus plowing the mire was the signal characteristic of his father. Thus we are in a strait, and yet, paradoxical as it may seem, everybody wants better roads.

I ask you to appeal that the State may be strongly wise in plan and so generous in appropriation as to tender such an award for permanent road structure as may be not only an incentive, but irresistible, for a State appropriation effecting good roads will return its many fold to the bank in a better financial standing of the people, to the railroad company, and by reason of the spread of country villas, more daily travel and freightage between country seats and town stores, operas, churches, fairs and so on, and to the investor the appreciation of farm security, to the borrower an easier money market.

The feasibility of constructing stone roads depends upon the presence of stone. While in Susquehanna, roads can be built cheaply because of plenty of stone, in Crawford, because of a scarcity, stone roads will cost more. Now, if, by reason of plenty of stone, Susquehanna desires to build permanent roads, and if by reason of their scarcity, Crawford feels unable to build, Susquehanna evidently should be allowed the option of building and Crawford the option of not building. Thus a law can be made general, giving all our counties or even township the option of independence of doing as they may elect in the matter, and thus if Chester county shall elect to use of the State appropriation and may so choose to build roads, York county cannot reasonably deny, because the real estate of York does not pay for the Chester roads inasmuch as the State appropriation is not a tax upon the farmers of York. Thus, if township are given the option by a general law, one township need not interfere with the choice of another township. Then, again, we might go further and determine that if a township shall not elect to build a certain road, then again individuals may be privileged to do so under the Ohio system. Then, still again, should individuals not agree to build, as a last resort, companies should be given the township right of building toll roads, under charter. Of course we want free roads, but if many townships are restrained from building free permanent roads, toll roads will certainly be built. The only way to check toll road structure is to build free macadam. Thus to-day it will be easier to secure a macadam law than ten years hence, and so I think that farmers in their granges and organizations should endeavor more to agree than disagree.

Now, I cannot expect all to agree with my ideas. Because all people may not agree with me, I should be willing to secure for my idea just what I can get and no more, but I should not risk the entire loss of that idea or plan by defeating all other ideas or plans that are not exactly consonant with it. Thus the first effort of all upon the part of farmers is, first, to get a thorough knowledge of the cost and economy of stone roads. Then, as a second step, to come to a generous and intelligent agreement. Then, as a third step, to press your agreement or sentiment upon your road commission and legislators, and as a sequence you will

get a result equal to the value of the sentiment you have made. That is if you conclude to ask that bogs be retained, no matter what bogs may cost you, you can have bogs, or if you conclude that you want hard, twelve months roads by stoning your worst roads or worst parts of roads you can have, upon demand, the plan and sinews by which macadam can built.

If you please, I will recapitulate. A State appropriation in behalf of better roads will be moneys paid by railroads, banks, and corporations generally and also by owners of bonds, mortgages and notes. Thus, if Pennsylvania appropriates money for a road administration and construction, farm owners can freely sanction a generous appropriation.

A 6-inch macadam means virtually an 8-inch depth road at the lower cost of a 6-inch road, in that it is composed of three layers, one of 2 to 3 inch rubble, one of an inch-and-a-half stone and the surface of stone chippings to the depth of 2 inches. This bed being laid upon a convex, dry surface, and being well packed by using a traction engine and iron-wheeled truck for hauling, will equal a loose, large stoned 10-inch depth.

It is best to allow townships self-choice either for or against macadam structure. Thus where roads are of sand or slate loam the citizens of such township need not build nor can they reasonably impede road structure in another township, where the roads are of clay, and an injury to the public four out of twelve months in a year. By a general law allowing option to townships either to build or not to build, all confusion of opinion and diversity of condition is minimized.

In order to issue township bonds for road purposes there must be an unquestionable basis and authority so as to create an attractive low interest loan. Thus there is legislation needed.

As reapers, binders and mowers cost at one time double their present prices, so when the full economy of road structure is reached, when crushers and competition between contractors is increased and the knowledge is acquired that less bulk of stone is needed, the cost of macadam will be reduced.

There is needed road supervision by bonded experts capable of estimating and enforcing true estimates of costs and of determining between the rights of the people against any unjust claims of contractors. Expert supervision is needed further to insure the most durable, comfortable road for the least sum of money. The cost of a skilled county engineer would be earned several fold in the saving of money, comfort and health to people.

Should the State appropriate annually \$1,500,000 (this would yield an award of \$400 for a mile in each district per year) and allow, in addition, a sufficient sum for the support of a road bureau, the appropriation would be generally accepted, the bureau being composed of experts and I repeat, our roads would be honestly built, and for a reasonable sum and under the safeguard of State provisions and specifications.

You will pardon me when I say that since talking to the people upon road betterment I have regretted that forty years ago, when a student, the subjects of economics was not taught in the schools. I now appreciate the vast loss to the people of the absence of this study from the curriculum of our common schools. After urging a State appropriation for the betterment of roads, good people of ripe years take me to task, urging that I uttered no word insisting that personal property should be taxed on account of road betterment, so I thought it best to continually explain that a State appropriation is an appropriation of personal and corporate property taxes.

As individuals we are more far-sighted than as citizens. We will pay two dollars extra for a rocking-chair or nine dollars extra for a lounge, or twenty dollars extra for a sulky cultivator or plow, rather than walk. As individuals we find economy in self-rest, self-comfort, self-luxury, without thought of any money profit. But as citizens we cannot always see that a raise of tax for all the year round, permanent roads not only secures health, comfort, luxury, but is an investment equal to that of a building association, creating its measure of wealth in increased farm values, in its saving of waste, time and draft. If forty years ago economics had been a part of our school curriculum, we would have been wealthier as a body politic to-day.

No matter how cruel our roads may be to us, or how they may scandalize us with the shame of lacking even the least modicum of business spirit or Christian endeavor; no matter how they rob us more than trusts may rob us, still they despoil, still they take hours away from our comfort and add hours of storms and stinging cold and buffetings to our lives. While it is perfectly right and incumbent to aim our censure at "combines" that bear the price of our products even in time of scarcity and demand, it is equally well to reserve a share of judgment to ourselves in permitting self-cruelty and self-robbery through the agency of bad thoroughfares, by failure to fearlessly stand up and press for a road system based upon a material that can only transform the bogs of winter, the bogs of the coldest, most stormful portion of all the years into fleet, smooth, indestructible roads.

When I go to the end of my drive and see a child the Scriptural "least of these", upon whom, under the Divine lesson, the largest pity and protection should fall, rudely jostled by the wretched road, pierced by cold until the tears stream away from his eyes, the journey because of its torture unmercifully long, the gait so slow to the tenderness of the child even to the suffering of the strong: when I often witness such sad sights as these I ask myself: "Am I, or is the State, my county or township to blame?" Truly I am, as *all* are accountable who permit this cruelty without protest or effort to remove it. It seems almost as if this, our year of floods, had come to teach us something that is best for us to know and do, that the day is fast passing wherein we now "strain at gnats and swallow camels."

Prof. HAUPT, Mr. President: I have listened with a great deal of interest to this very interesting paper of Mr. Downing's. The paper at least seems to be limited in its scope to macadam roads. Macadam, as we all know, is not applicable to all roads; and therefore I desire to say a few words upon the road surface road building. It is evident that one who has in charge the construction and operation of roads should be a man with large scope, who has knowledge of the business, skilled in engineering, who knows how to make the best of broken stone roads, and, as far as possible, roads with the best results from the materials at hand. We all know that in a dry season our roads are passable, and possibly good, and that the resistance to traction at that time is at a minimum; but that after rains they become almost impassable—that the rains make them impassable. So in the construction of the road an effort should be made to preserve it as much as possible from dampness and water, and that is done by proper draining, and that is an important consideration in the establishment of roads. That being done, the ordinary earth road may be made passable and in good condition throughout the whole year, and in that way an earth road can be made more readily than a stone. So the earth road should

receive due consideration in this general topic. Earth resistance is a very important one, to reduce to a minimum.

In order to give an idea of what that amounts to, I will go over in detail the results of resistance. If it be assumed that it requires one horse to move a ton on an iron tramway, then we find that to perform the same work on other surfaces there will be needed for asphalt one and one-half horses; for well laid Belgian block, three and one-third; for ordinary Belgian, five; for ordinary stone block, eight; for macadam, from seven to eight; for good cobbles, from six to thirteen; for ordinary cobbles, twenty-five; for a good earth or gravel road, dry, twenty; and for sand, forty horses.

That will give some little idea of the enormous resistance there is in the softness, or the liability to yield of the material of which the surface itself is composed. That, therefore, is a subject of important consideration; and the points, therefore, to which I expressly desire to call attention in the construction of roads is the soil, the drainage and proper surface for the wearing surface of the road. If it be necessary at times to build a road through a bog or swamp, then it becomes necessary to pay especial attention to the subject of drainage, and to the material used; and there are various ways and various details to be considered under special conditions which exist in different localities. But I do not wish to take up the time of the Board with any extended remarks upon the subject.

The Board then listened to the reading of an essay on "Road Statistics of a Chester County Township," by John I. Carter of Chatham, Pa, as follows:

TOWNSHIP STATISTICS AS RELATING TO THE ROAD SUBJECT.

London Grove township, Chester Co. Pa., fairly represents the better class of farming townships in eastern Pennsylvania. It contains no large manufacturing interests, or incorporated villages or towns. Although it has two or three small villages within its limits, yet it can fairly be called an agricultural township.

It contains about 134 farms, aggregating 11,257 acres, or an average of eighty-four acres to the farm. This does not include village or other building lots or gardens. The selling value of these farms would not be far from \$900,000. The assessed value of the taxable real estate in the township is \$1,433,458.

The number of taxables, is 739, and the whole population about 3,000. The returned number of horses and mules over four years old, 537, valued at \$31,090—of cattle 1,037 valued at \$27,650. The actual value of all stock on the farms would be three or four times that much.

The money at interest returned, is \$370,000. This township is about six miles long and four miles wide, and has within its limits about seventy-five miles of public roads: Two-thirds of these are important thoroughfares—the balance by-roads and cross cuts, but require public maintenance all the same. The assessed road-tax is, \$4300, raised by a levy of three mills on the dollar. About twenty per cent of this is ex-

pendent on the repair of bridges and culverts, and the balance on the general repair of the roads. These roads are sold out in short sections, to the lowest bidders, for a term of three years, under specifications, clear and good enough.

The purchasers, are mostly farmers, who buy the sections adjoining their farms; two supervisors having general charge of the road repairs. These roads are mostly dirt roads—though we have five miles of old pike built in 1815, but given up to the township thirty years ago. Our roads are bad—I think mostly bad, and the system of "selling them out" is liable to several very serious objections.

First, With few exceptions, farmers don't know how to mend roads. Second, The short term of sale, precludes, permanent or substantial improvements. Third, Farmers will favour their own by-ways, water-turnouts, etc., often to the serious injury of the road. Fourth, The purchasers seldom have adequate help, and the roads are fearfully neglected, seldom receiving any but meagre semi-annual mendings. Fifth, The "all in the same boat," condition of the buyers prevents redress or punishment.

The other usual way of "working out the tax," is also objectionable.

People seldom work well for a "dead horse." The labor sent out is unskilled, and can seldom be had when most wanted. Farmers have not help enough to do their own work. I will digress long enough to say, that the main cause of the depression among farmers at the present time, is the high price of labor, its scarcity, and its poor quality. But what shall we do about our roads. Advancing civilization demands better roads. The comfort and pleasure of the people demand it. The altered character of the travel, requiring speed and promptness and the general economy of wear and tear of wagons and horses demand it.

But a glance at our present tax rate, and the distressed condition of the farming interests, precludes any hope for the adoption of any general system of piking. It is beyond our reach. It would be folly if not dangerous, to look for State aid. Reaching out for either State, or National pecuniary aid, is not only a snare, but undemocratic. It is unjust, because the distribution must be unequal. For years to come, our main dependance will be our dirt roads. How shall we make them better? Begin by educating the people to the desirability of better roads. A demanding public sentiment must stand behind all effective reforms. When the people will, it must be done. Our roads and road making must be systemized. Almost everything connected with our roads at present, is a perfect chaos. Each township, each supervisor, and I might almost say, each road mender, works on a plan of their own, which practically is no plan at all. But the laying out of new roads, the vacating of old ones, and the general construction and repair, should be in the hands of a county commissioner, (if not a State commission,) and the whole work systemized and based on business principles, just like any other great public work is done. Almost every new road and every repair is subject to the warping of local influences, that seriously injure the work.

The election of supervisors for the short term of one year, is unsettling and retards thorough or permanent improvement. There should be three supervisors, elected for three years, one going out every year, thus securing definite plans and an experienced Board. A corps of trained men should be on the road throughout the season, repairing every weak place as soon as noticed, one or two large scrapers, for the

spring and fall repairs, and two small ones for daily use, in leveling ruts and filling depressions, would keep the dirt roads in excellent condition much of the time; of course the rains will soften most any soils, but good under and surface drainage and the ruts promptly obliterated will keep almost any road in passable condition, and this can be done with little or no increase of taxation or expense.

Secretary EDGE. Mr. President: I do not wish to trespass upon the time allotted to those who are compelled to leave in the evening trains, but I take this opportunity to say that, considering the essays of Mr. Downing and that of Mr. Carter together, it would appear that the township of Londongrove has expended sufficient in repairs to roads during the past twenty six and one half years, to have completely macadamized them. The only theory upon which we can disapprove this, is either that all of the road tax if Londongrove township was not used in repairs, or that Mr. Downing has underestimated the cost of macadamizing, and it is quite possible that both of these theories are correct, and to a certain extent modify the statements.

D. B. McWILLIAMS, of Juniata. I read an article last week in a paper on the subject of roads. The article referred to a road in the State of Virginia, which is called the Lancaster road. One terminus of it is in Staunton, Va.,—I forget the other terminus. That road was built previous to the war. Notwithstanding the hard usage that road was subjected to during the war, and the heavy artillery that was hauled over it, it is said that that Macadam is yet in excellent condition. The object of his article was to show that when a Macadamized road is once thoroughly made, it will stand any amount of wear.

DAVID WILSON, of Juniata. As this meeting is one mainly for the consideration of roads, what kind of roads we ought to have, and how they should be made, it is eminently proper that we should get the opinions of the people present here. That will tend to educate the people from whom we come, and to educate ourselves. I will, therefore, suggest that anybody who feels like it, should give his opinion of what a road should be, and how it should be, and who should superintend it. For my part I think no road system will be perfect until there is some skilled road supervisor in each county—I mean an engineer, and a skilled engineer, one who is theoretically and practically acquainted with engineering; and it should be his business to look after all the roads in the county, and this person should be appointed by the court. Then he should be appointed for at least two years, subject to re-appointment as often as the court thinks proper. Without an officer of this kind, I do not believe we will ever have good roads in Pennsylvania. And in regard to roads in each township, it seems to me it is necessary to have one supervisor in every township; because, if not, some township might be neglected, and jealousy might spring up on the part of the township towards the engineer. But if there is a township supervisor, he would look after the interests of the people. And he should be elected by the people, and if a good officer, re-elected from year to year; and, if not a good officer, left out, and somebody else elected. Now we are upon some of the few details relative to road making, and I think they should be well considered; and I would like to hear from others on the important subject.

Mr. M. G. BROSIUS, of Chester county. I feel somewhat backward about saying anything before you as an individual, but I believe I should say something as a representative from the county of Chester. As an individual I would prefer to remain quiet; but I feel that I ought

to say something for my people, as well as say something to the people at this meeting.

We are frequently asked to help ourselves, and we have been urged to be heard here. There have been so many different opinions expressed here, that a person coming from a farm will have some difficulty in adding anything to them. But I want to speak of our convictions at home before I came here. The people that I represent are very anxious for some improvement in the public roads,—we feel the necessity of it. We feel that we are tied hand and foot so as to prevent us making any improvements in our public roads.

We are all of the opinion that dirt is sufficient to travel upon in our county,—we do not feel that we can travel upon pikes yet. We feel that it is a long distance off, notwithstanding the roads are piked near the large cities, or around Bryn Mawr, as people have stated here to-day. But we want the old laws done away with,—we want some new laws by which in our county, as fast as we can, our people will improve our public roads. We want some competent person to first take charge of our roads as they are,—we want to spend some money to make portions of our roads permanently better. There are some road we could manage from year to year. There is dirt enough to make any amount of dirt roads. We want some power which will enable us to pike those roads. I suppose we can educate the people to furnish the money,—we know that some one ought to furnish that money largely for us. We can furnish it to a great extent. I do not think, as far as I have studied the matter, that State roads from east to west through the State at large are right. We had roads long ago when we needed to travel great distances in one direction—where we wanted to haul from Pittsburgh to Philadelphia, or any other great distance. Now we do nothing of that kind, but travel is in all directions. We want roads as a net-work, but we do not want any of those general things. We had them, and let them go down. Now, when we go great distances, we go by rail, and we do not haul anything a great distance by wagon now. We simply want to make our roads as good fast as we can.

There are a great many people in our country who will not listen to anything, and we want some laws which will allow us to improve our roads as rapidly as we can before getting all the people to submit to it. We have no such chance at all at the present time, and we claim, if we had his power, we could do much better. I feel that the public roads should be made and kept in order the same as other public improvements are made at the present day. We know that our supervisor goes out and mends the roads, and they are well mended at the time. But the way the work is done we do not approve of at all, notwithstanding they go and have their road made into very reasonable condition in a short time. But you all know this year was an exception, on account of the weather we have had, and you must not look at this kind of a year particularly. We also all know that for many years we have had our roads made and in good condition early in the year; but just as soon as the road supervisor is done, he goes home, and the road scraper is placed under the shed near the supervisor's barn,—and the supervisor is generally a farmer,—and the roads run down. We claim that a man should be supervisor for the whole year, the same as the man who runs the railroad. We want to see that that man is appointed or elected with power to employ the number of men it is necessary to have to keep the roads in repair continually,—every day in the year, if necessary, having one or more operating on these roads just as a little gang does

on a railroad. In our section of country they have five men in charge of four miles, and if they see a spike in bad condition it is withdrawn and a new one driven, and the road is always in good condition. What kind of a road would it be, if they did not attend to it? And that is the difficulty with our roads,—if those men were compelled to stay, the result would be different. Those railroad men go over the road, and they go over it again and again that nothing shall get out of order.

We spend in our township \$2,500 a year every year. Now that money should be partly expended for permanent improvements so that an additional expenditure will not be required on the permanently improved road the very next year. In this way, after the roads have been permanently improved, all the surplus money that is not used, as now, in piking, could go toward making even better the permanent improvements. I think we can show our people how good a plan that is. The people of the township can be educated in that way, and I think that we will be going in that direction ere long.

I do not think it desirable to pike more than a certain portion of roads. There is no doubt if it were a good road, we would get tired of the wrangling over the pikes, even if they were like that street between here and the hotel.

One word in regard to appropriations by the State. Now, we do not object to any State money that may come to us. We will take State money, simply because it comes from every one it ought to come from— from everybody;—and we farmers have to pay nearly all the road tax. Now, if we get it from the State, and you are willing to give it to us, we can take it; and let us have it just the same as for schools. If you have the money, just appropriate it to every county for improvements, and we will take it and bring about a greatly improved condition of our roads.

Vice-president McDOWELL. You have told us how to make a road; what provision would you make for washouts and for similar emergencies which cannot be foreseen? What would you do when bridges are carried off by floods?

Mr. BROSIUS. I stated that I would keep the men on the road all the time; in that case washouts would be by no means so likely to occur; the ditches and cross-ways being looked after at all times, would carry the water of any ordinary flood; it is this neglect to keep the roads in constant repair which causes so much damage when a flood does come. One man may, in five minutes, do work which would save the work of twenty men in twenty-four hours afterwards.

Vice-president McDOWELL. That would do for a small washout, but what would you do with a large one? I have seen ten miles of road practically washed out; it was along a narrow ravine and alongside a stream.

Mr. BROSIUS. In that case the supervisors would have to do as they do now; call out all the help that they can get; do just as a railroad would do under similar circumstances.

We thought it was a grand thing when we got our road scrapers; but we come here to-day and hear that they are abominable, and ought to be thrown aside. In our section of country eight years ago, when the road scraper was introduced, we supposed the necessary improvements could be made by them. It was near my place where a number of them were to be tried. The trial was to take place on a very bad piece of road. Only one road scraper came, the Phoenix, with four or five mules along with it, so that it could be used to the best

advantage. In making the road the manager showed us what a perfect road would be from our place to the station, which is three or four hundred yards. He dressed that road up completely. It was a kind of tough, black soil, and very difficult to haul through in bad weather. But he rounded it up completely on either side, and so soon as it once got dry, there was no rain that penetrated that road at all. The very minute it was done raining, you could drive to the edge without difficulty. That road lasted on and on for about two years before there was any mud holes in it. But just as things go—and it was not the sin of the road scraper—after that time the supervisor gave it a little repairing, and the water rolled in on this road, which made it the worst kind of a road, whereas it was the best kind without water. With a man to direct the flow of the water away, the road there would remain firm and good.

Mr. WILLIAM H. BROSIUS, of Lancaster. I was glad to hear read the names of so many great men of Pennsylvania. That list seems to be sufficient to guide any class of legislation in this great Commonwealth. Now it passed through my mind, when that long list of names, so familiar to us all, was read—if they would take hold of this living question, and be as liberal in regard to it as they are on others—if they are willing that all portions of the great Commonwealth shall be taxed, if they are willing to lay down their capital beside ours; if they are willing to place their railroad stocks there in order to make Pennsylvania a greater State than it is, we will have better roads. The farmers of this great Commonwealth have never shrunk from bearing their portion of the State's burdens. But to-day, with their great burdens, oppressed as they are, to impose the burden upon us of regenerating the common roads of Pennsylvania would appear to me to be suicide to all the farmers of the State.

We have been talking about roads that lead from the west to the east, which at one time were the great commercial highways of this country, paralleled as they were, extending from the east across the Alleghenies to the city of Pittsburgh. To-day we have great arteries of trade, bringing the vast products from the great West and delivering them upon the seashore, and placing in market our coal and iron at the smallest minimum of cost. And to-day, after we have all of this to depreciate the value of our farms, equalizing the values of the land in the West with ours, for us to be asked to improve the public roads at our own expense, it would seem to be but suicidal. But I am going farther than I intended. I want to say for the farmers of southern Lancaster, that they are willing to join hands with all the capital to do this. My friend and I differ in this, when he says that he does not want the State aid. To-day the real estate of Pennsylvania bears three times the burden of tax that anything else does in the State. But I will say in our county it is very nearly three mills school tax, about three mills road tax, and very nearly the same county tax. There our farms do not come in for State purposes, but our mortgages pay a three mill tax, being exempt from all the rest. If we are to improve these roads, and put them in splendid order, so that they can be used as well for fancy driving, as the bicycle, we undoubtedly should have our friends in the great cities to help us. I do not want to occupy your time here; but I think I am close to the mark when I assert that the farmers of this Commonwealth will never consent to the system that will add any more burden, without an equal share coming from all the citizens within the Commonwealth. I am willing to address this State Board of Agriculture, for I realize that it knows the interest of the

farmers of this State. I know that this Board, and its Secretary here, and all its workers, are deeply interested in the home interests of every farmer of the State; and I am willing to consign the question to them, and agree to whatever they do, for I believe they will do right.

Prof. JOHN HAMILTON, Centre County. I only want to run out the speech that was made by our friend from Chester county, (Mr. Brosius.) In his remarks he said that these men should be kept on the roads during the year, in order that they might be properly maintained after they were put in condition; that they had comparatively little trouble in keeping these roads in this condition; but that after they were placed in such condition they had been neglected. His suggestion was that a person should be employed to go over these roads every day; and after it rains that he should go out just as soon as it is fit. My point is, that after the roads have been put in condition, and the sun comes out, and the like of that, this man can go to bed and sleep; but just as soon as a cloud is seen in the west, that man should go out, and put on his gum boots and shoulder a shovel; and if that rain continues for half a week he ought not to go home. He can do more to save the township in one day in the rain, with his shovel, than could be repaired by two weeks' work afterwards. You can afford to pay him double wages for night work. And if a shower comes up at midnight he ought to go out with shovel and gum coat, and spend the night out on the road. The time for him to save money for the township is on a wet day; that is when the damage is done.

A good road, it is conceded all around, is a dry road; and you cannot have a dry road when the wagon tracks are running down the hill. A man in a day working with a shovel to preserve a road intact will accomplish more, and save more dollars to a township on a wet day than any other time. There will be no washouts, if you have a man there attending to it. The reason we have washouts, is, because we have the man in the house waiting for a clear-up. We want men on the roads day and night as long as the rain continues. It is not so much the first expense, as the maintenance of the road.

The maintenance of a public road, as has just been remarked, should be like the maintenance of a railroad—you must be there every day. I take it that the Pennsylvania Railroad Company does not allow its men to stay at home and be under cover. The reverse is just what they want. When there is a big rain, that is the time for the greatest diligence and vigilance on the part of those people. Now, that is the way to keep good roads, after you have them.

I believe that the proper method with us is something just as has been suggested—that if we can have a law that will permit or will require the men who pay taxes, to pay the taxes in money, and then if we shall have an intelligent supervision—for you cannot have a good road without a competent supervisor of a road, any more than you can have a good locomotive engine without a competent mechanic to manufacture it. You must have a good supervisor.

I believe the plan to employ a keen engineer as the supervisor of the county is a good one; and, if he should be employed by the court, I believe that one county supervisor is sufficient. But he should be a man appointed by the court, and appointed because he is competent, and that his work upon the roads shall be as stated; that he should not be a man with other occupations, but have this one thing to do, and attend to that one thing. He ought to be some body so reliable that when you go to bed at night, you know that there is some one looking after the roads—

that the boys are out, and the roads are being taken care of. Some such plan as that will, taking the money that you now have, put them in good condition. We can do it with the money we now have. It needs somebody to know how to spend it. You know there are plenty of men who make enough each year to be wealthy every year; and you go into their houses, and they have not the comforts of life, because they do not know how to spend money—and these are the trustees we need, the men who know how to spend money—and every man is better off by having somebody to look after him a little. I would have the county engineer to make a report as an inspector of roads, as well as to make a report of the condition of roads at the various sessions of court. So if a supervisor were neglecting his duty he could be brought before the court and made to give an account, and punished, if necessary.

Mr. JOHNSON MILLER of Lancaster county. Mr. President, I rise to endorse what my friend from Lancaster (Mr. William H. Brosius) has said. He represents another end of Lancaster county; and I fully concur in what he has said.

We have in our county 960 square miles of territory, or 620,000 acres, divided into 9,000 farms, valued at \$69,000,000. We have forty townships, with an average of seventy-five miles of road, which gives us in this county about 3,000 miles. Hence we have an interest in this road question. Under our present system we expend about \$60,000 or \$70,000 on the roads annually, or about twenty dollars per mile, according to the official estimates that I have collected, which would be twenty dollars or over a mile; to which may be added \$40,000 more for repairs of bridges and so on, which of course we would have under our system.

As relates to the supervisor, I recently had a talk with the supervisor of the township in which I live, the township of old Warwick. He made an estimate, and said he could make the roads of that township at an expense of sixteen dollars per day, and that on each day he could make two miles of good road, which would be at the rate of eight dollars a mile to repair the roads under the present system. If all the supervisors would do this, it would be a saving, under the present system, of twelve dollars per mile, or \$36,000 per annum, in that county compared with what we now expend.

I do not wish to make the impression that our present system is the proper one. I think we ought to have a uniform law, and to wipe all the old laws out.

Now the question comes in. What kind of a change are we going to have in this matter? We certainly want a change; but we do not want a change perhaps which is as extravagant in its nature as the men would like to have who seem to be at the head of this movement. For instance, the wheelmen, or the pleasure drivers. The wealthy men of Philadelphia would like to have a macadamized road around the four counties of Philadelphia, and the farmers to pay for the making of those roads. I do not think that will ever be accomplished. I hope and trust the State Board of Agriculture will not endorse such a course. If we could reach all the money in the state, and make it taxable for road purposes it would be different. In Lancaster county our farms are worth \$69,000,000, and we pay the road tax in that county. We have in that county \$25,000,000 alone on judgments and mortgages, and about \$5,000,000 in turnpike and other corporations, making \$30,000,000 which do not pay a dollar road tax. This does not look altogether right.

Let me give a few statistics on macadamizing and piking roads. I do not understand how they can make a turnpike or macadamize a road

in Chester county at a thousand dollars a mile. We have had a little experience in building turnpikes. There were two pikes built in my township, one, the Lititz and Lexington pike, three miles, costing \$13,000 or \$4,333 per mile. Another turnpike, the Lititz and Rothsville pike, one and one-half miles, cost us \$6,000, or \$4,000 per mile. Now the stone were found on the bed of those roads—they were quarried right there, and ought not to have been hauled at all, hardly; and yet those pikes cost from \$4,000 to \$4,500 per mile.

Mr. SEARLE. How wide was the road?

Mr. MILLER. The road bed is thirty-five feet, but we piked only fourteen feet of that. This macadamizing cost \$4,000 per mile. If Lancaster county should be required to turnpike its roads it would cost in a township like Warwick, which has seventy-five miles of road, \$375,000. This would make a tax, if that system were carried out, in Lancaster county of \$15,000,000, or just one-fourth the value of our farms. It would be \$250 tax on every \$1,000 valuation, so that a \$10,000 farm would be taxed \$2,500.

If such a thing were possible—which is not likely to be the case—after these roads were macadamized or piked—which ever you choose to call it—let us see what it would cost us to keep them in repair, notwithstanding some person has said that macadamized roads cost nothing for repairs.

I have the statistics of ten of the best turnpikes in Lancaster county, showing that turnpiking and macadamizing would cost more to repair than our common roads. The cost for repairing for five years of the Lancaster and Lititz amounted to \$9,000 for the eight miles, or an average of \$225 annually per mile; the Lancaster and Manheim \$7,000; ten miles; an average of \$140 per mile. The Lancaster and Manor \$10,000 for five years; length of road five miles; an average of \$400 per mile per year. The Lancaster and New Danville, \$6,400; length of road five miles; \$160 per mile. Strasburg and Millport, \$3,875; length five miles, at \$155 per mile annually. Lancaster and Willow street, \$3,625; length five miles; annually cost \$145 per mile. Lancaster and Bridgeport, \$2,100 for three miles five years, or \$140 annually per mile. Mount Joy and Marietta, \$3,125; length of road five miles; \$125 per year a mile. Lititz and Rothsville, \$3,000; length of road two miles, or at a cost of \$300 yearly per mile. Lancaster and New Holland, \$12,980; length of road fourteen miles, being an annual cost of \$185 per mile. Thus these ten turnpikes expended during the past five years \$61,105 for repairs, or an average of \$197.50 for every mile of pike of those ten roads. Thus showing that on an average of five years our turnpikes would cost nearly \$250 per mile for repairs, if they were made. Then, taking all your roads, they would cost ten times more to keep them in repair than they cost now, thus making the annual cost in Lancaster county nearly if not quite \$600,000.

I cannot see that we can have good roads, unless we turnpike them. You may do so in some sections of the country, or in other sections; but you could not do it all with us. In this connection I have given those statistics for the purpose of showing just what the repairs of those roads would cost.

Now, as regards this matter of legislation, or the new law, a great deal has been said to-day; but I do not think we have arrived at a conclusion yet what would be the best thing to do. I was almost tempted to say that we do not want any legislation at all; but it seems to me we are drifting that way, and we are going to have it any how. The question

is whether it is going to be controlled by farmers, or by capitalists of the state, and those who go out pleasure driving, and bicycle riders, and that class of people. I believe it should be controlled by farmers. I believe that the State Board has a powerful influence in connection with the commission that is now here, to so frame the proposed law that it will be on the side of the farmer. I do believe my people at home will object to any law that will increase the taxation of our people—but it is generally thought that the people in Lancaster county are rich.

The supervisor came into my place yesterday, and the inquiry was made, how is the road money? And the reply came, roads bad, and money scarce. And so all over the state. With us the farmers state that they pay \$100 tax on \$500 income, and about \$500 profit on a 100 acre farm. Thus we pay almost one-fifth in taxes as we go.

I think that we now have a good supervisor in our township; and if you have an experienced superintendent of the whole business—an experienced man in each county—in order to meet the expense, why not have the state make an appropriation of \$1,000,000 for road purposes, the same as for school purposes? The money at interest in the state brings over \$1,000,000 to the state treasury; and I think the state can afford to pay that back to the counties. In Lancaster county we would have returned to us the \$75,000 which is paid in the tax on money at interest. With that sum appropriated to us by the state government, there would be about \$2,000 to each township. In that manner our farmers would be encouraged, and we could improve our roads to that extent.

Mr. J. T. AILMAN of Juniata county. I do not know how it is in other counties, but we have very few good roads in Juniata county. Some of them are not only not good, but it is doubtful whether they can be made good. We have a few gravel hills, and the roads at the base of those can be kept in pretty good condition without much else than nature has given; but with the rest of our roads, even with that force on them recommended by Professor Hamilton, we could not keep them continuously in good condition. On my way here I had occasion to drive four miles to get to the station. Just before that there had been a rain lasting a few days; and the people will drive on those roads when it rains. Somebody had driven along this road just the evening before almost the entire distance I had to travel, and his wagon went down from two to four, and in some places six inches. During the night the weather got quite cold. This froze the roadway as hard as a rock, and I had simply to come plunging along all that distance, and it took about four times as long as it should to get to the station. But the people will drive, and the wagons will cut into our roads as they are now constructed. The only possible way by which you can have a good road is to purchase a mill like that which Mr. Downing has been recommending so highly, and take the stones and grind them up, laying the coarser and the finer stones in the manner he has described. And I do not think it will cost so many hundreds of thousands of dollars as our friend from Lancaster (Mr. Miller) thinks it will. But we will have to be content to go through the natural mud of our roads unless we can do this, or carry out some other effective plan. We will have to abandon the idea of working out our road tax, and instead pay out our tax in money; but still there can be opportunity given to farmers to have those stones hauled from the stone piles to the stone crushers. For the miserable roads in our township we have to pay \$2,000 to keep them in repair. During the few months of summer, when it is dry, the

roads are in tolerably fair condition, but the rest of the year we have to take it as it comes.

One word about state appropriation. I am surprised at our friends from the rural districts coming here and being so much afraid to ask the state for a few dollars in money for the benefit of the country at large; while they will not object to voting many thousands of dollars in other directions. I am willing to bear my share of the burden, but I must solemnly declare against any more inequalities. How in the name of sense are we going to have better roads and better schools without state aid? In our county it is so much for schools, so much for roads, and so much for other purposes. Our good friends who are so fortunate as to have their money invested other ways than in farms, pay no tax on roads. I think there is no possible way to bring this reform about except by larger appropriations from the state for road purposes, and in a way which shall be perfectly just and equitable.

Mr. LOCK. We have been discussing the making of roads, but we have been confining ourselves principally to MacAdam roads. I want to inquire whether more suggestions could not be made in regard to many other kinds of road? While I believe that the MacAdam road would be far preferable to the majority of the roads that we have in the state, I think our improved road, perhaps if not in the near future, will eventually be a steel road, and I think it will be far preferable to the MacAdam road; and in building the latter we will only be throwing money away, when we necessarily find that the steel road will take its place.

Mr. JOHN I. CARTER of Chester county. What was the income from those wonderful pikes? I suppose they were all incorporated.

Mr. MILLER. I have just given that list over to a reporter. So far as I know of those pikes, the companies have declared dividends of from three to five per cent. The capital invested in those ten pikes—I will say ten; I have an estimate on the whole of them; there are twenty-five turnpikes—and the estimated capital of them amounts between \$600,000 and \$700,000. But those ten have declared dividends during those five years, on which the \$61,000 was spent for repairs—dividends of from three to five per cent. annually. I think one road, leading from Lititz to Lancaster, has declared twelve to fourteen per cent. on the par value of the capital stock—not on the estimated value I have given.

Secretary EDGE. What is the aggregate length of those fine roads?

Mr. MILLER. I cannot say. The aggregate of the ten pikes that I have given is sixty-two miles, and the capital stock about \$300,000.

Hon. WILLIAM EVANS of Chester county. Coming as I do from the county of Chester, and representing a great agricultural interest, I, at the present, feel the embarrassment of the situation. Our roads are in a deplorable condition, and how to improve them is a question. We know very well that if we had the means, there would be a way found to make the improvements. But we have no means—no resources from which to draw our means, but by taxation of farmers of the vicinity.

We know that further taxation is a question of good public roads, or homes; and we, the farmers of that district, estimate it of more importance—the home of more importance, and will be—I mean our own domicils—than the roads at this particular juncture of this crisis—in the embarrassed situation of agriculture. This agitation of the public roads come, perhaps, at a time illy-suited to further outlay in that direction, without aid from some other source.

The first thing necessary in the consideration of this great question is the ways and means to bring these great improvements about, and I for

one can see no other way than to ask a revision of the tax laws by the Commonwealth of Pennsylvania. The tax laws are certainly at fault; and the representatives of the people who come here to make and revise laws—it is their fault that the deplorable condition in our roads exists as it does to-day.

I would advocate the taxation of every species of property in every district of the commonwealth; let every class of property bear its *pro rata* of expense in running the public affairs of the state; whereas now the real estate of the commonwealth is paying to-day four-fifths of the cost of all the public expenditures of Pennsylvania. Now, is this right? is it just? is it equitable to expect the farming interests of this country to sustain this unequal taxation? Are we so unworthy that we thus must be crushed to sustain all the great educational, charitable and other institutions of the state? I think that the agricultural interests of this great state deserve as much encouragement from our authorities as any other branch of the commonwealth.

On the question of formulating a law, we all know that the existing road laws of the state are behind the age in which we live. They do not apply to these progressive times; and in order to formulate something that would be acceptable to all the varied interests of this state is a herculean task. I sympathize full well with these gentlemen who have this great work in their hands. If they can formulate something that will be acceptable to every section and every interest of this state, they will have accomplished something almost marvelous; because I know full well that laws that would perhaps suit one class of our citizens would be very obnoxious to another class; and to draft something that would be acceptable to all is almost an impossibility. But I would recommend, as an humble citizen of this great commonwealth, that the commission prepare a bill, and have it passed into a law, that will authorize the election in each and every township of the state—what I would call a road commission, of some six members, or even ten. My argument is that the nearer you bring these questions to the people, and identify the people with them, the greater interest they take in them, and they will thereby be made to feel the responsibility that is being placed upon them, and it will also guard against the extravagant expenditure of the resources of those people. I would prepare something like the school laws; for the school laws have been very successful and satisfactory to the great majority of our people, and I have not heard a murmur against them.

By electing six road commissioners in each and every township, the first year two, whose term shall expire in two years, and two, their terms to expire at the end of three years, you keep up a continued interest in the improvements that are going on in the respective districts. By electing new men every year the interest seems to cease at the expiration of their terms. When new men take hold of it they perhaps have not the same interest and the same disposition to carry forward the improvements that have already been begun. I feel confident if these six commissioners were authorized to lay a tax, and they authorized, if they saw it expedient, to borrow such a sum of money as to be equivalent to the tax laid, and if the state were to make an appropriation, the law could be so framed that the state would be required to appropriate as great or even a greater sum than has been appropriated to the public schools of the state. I believe at present the public school appropriation is some \$2,000,000.00. Perhaps that would not be any great aid in the direction of piking our roads; but it would be a beginning; and I

dare say that after the tax laws are re-adjusted, and every class of property brought into bear its proportion of the burden, the appropriation by the state might be increased to \$5,000,000.00, or even \$6,000,000.00, and even then not be a serious inroad upon the treasury of the state. If this road commission would throw this responsibility back upon the people of the respective districts, I fully believe that all that is necessary to the proper carrying out of the law is a good commission of six men in each district. This great system of engineering, with a course of six or more years in order to be qualified to make a country road, is all bosh. I know very well a number of practical farmers who have had enough experience to know how a good country road should be made.

This is a very important question, and I know it is being discussed from one end of the state to the other, but how to get at it is a question, for I feel that the farmers cannot bear one farthing more taxation in that direction. The valuation of our farm properties, instead of being increased will have to be put down to equalize the taxes. In Chester county our farms have depreciated fully thirty-three per cent. in value, yet they are valued up to-day as they were in war times. Now, even though the roads are the same, the tax is proportionately greater, because the prices we have to take for our products make it doubly difficult and hard to meet the taxes. I feel that it would be a great injustice to increase the taxes upon our agricultural interests at this time. Better to put up with what we have than to take upon ourselves the evils that we know not of; for this thing of a bonded debt upon the farms of this state would perhaps be an inheritance for your children after you shall have passed to your silent tomb. There is no way to wipe out a mortgage other than by paying it off, and to pay off such an obligation or debt would perhaps be a ruinous thing. Therefore, by relegating this whole subject back to the district, and they being the freeholders of the district, this thing would certainly be handled very discreetly, cautiously and carefully, and I cannot see how they would take any risk in it. I have not given this thing any particular study, and I am hardly prepared at this time to extend my remarks. I am fortunate in being here to-day to hear the different remarks of gentlemen upon this great question. I have been very much interested in what they have had to say. Some of the addresses have been very good, and some, in my opinion, I could not improve upon at all.

Hon. CYRUS GORDON, Clearfield. We came here this morning upon invitation, but not to take up your time with any remarks or to express any opinion. Instead of that we came to hear the views of the State Board of Agriculture and others in attendance. So far as I am concerned, and I think I express the sentiment of the road commission, I want to consult on the subject. We understand that this demand for the revision of the laws is in the interest of the farming community, and if we cannot do anything to advance their interests, then we will feel that we had better do nothing at all. So what we are here for is simply to be enlightened. I have not made up my mind, and I do not propose to do so, until the evidence and arguments are exhausted on both sides. Now, there are a number of questions that have come up, and one is whether the law shall be changed relative to working out taxes, or whether it shall be a cash tax. If my recollection is correct, there has not been a gentleman here to-day who has expressed himself otherwise than that a change is best. If there is a gentleman here to-day who wants this tax worked out I would like to know it. It has been said to me that the farmers of Pennsylvania would not submit to that change.

I have not seen any evidence of it with farmers with whom I have conversed.

The next question is that embraced in the legislation under which the road commission was appointed—and an important feature embraced in that is the question of state aid. I do not believe, unless I am mistaken, that anyone here to-day has expressed disapproval of that.

Mr. SEARLE. One.

Hon. CYRUS GORDON. No; this gentleman was misquoted.

Mr. SEARLE. Yes; one came out squarely against it—Mr. Mantor.

Hon. CYRUS GORDON. I believe that is correct. What we are after is to know what is wanted, and that is all we want to know now. We are here simply to be enlightened on this question.

Now this gentleman's views in my opinion were correct in regard to the object of this whole matter; and that is that it is not to build thoroughfares through the state. It is a matter in the interest of each locality, to enable a farmer to get his produce from the barn to a railroad station; and if those roads can be made up in such a way as are the best thoroughfares, all the better; but the primary object is for the benefit of localities by the improvement of local roads.

There are several other matters that are important here. It is very well to consider just what we need. I do not think it is very important for us to waste time here in saying that the roads are in bad condition, and that they need to be repaired, and that we need something better than we have. We will admit anything that you say about the bad condition of the roads. But there is a great deal of talk now about state aid, and state control, and county control. Now, these are all important questions. You all know that to better them looks pretty upon its face, but when you come to dove-tail the whole together so that it will make a complete system to cover the whole state, that is a very different thing. Professor Hamilton talked about the court appointing supervisors, and others about having an engineer of ten years' practical experience, or any number of years, or months, to be appointed by the county authorities, or by the courts, etc. In this connection I make this point: Wherever you lodge the control, you must necessarily lodge the responsibility going out from the road not being in repair. You cannot lodge in the state any of the roads in this state, unless you make the state control responsible for damages. Now, that is for you to consider. You cannot have the county have control of the roads in the township, unless you make the county treasury responsible in damages. And the question comes up, to many at least in my county (Clearfield), when a road becomes out of repair, and a person is injured and brings a suit against the township, and recovers his damages, the interests are all there; those who are tax-payers are interested; the freeholders of the township are all interested witnesses. The issue is not made out against the county, or against the state, which are very little interested. It is a very important question, whether they are interested or not.

Now it is all a very nice thing, but you must have a system that will work out itself, that will be complete in all its parts. There is one thing that may suit very well, but when you come to compare it with something else it works very differently. Some are in favor of county control, and leaving it with the county commissioners, giving as a reason the salaries. And here comes in another obstacle, the making of salaries in some counties larger than in other counties, and in some again three or four times as large as others.

Now there are these questions to be considered. As to state aid, it

has been stated very clearly by several of the parties. In considering that matter, you want to consider the different sources of this tax. The road taxes are levied upon real estate and upon horses and cattle; the state taxes come partly from mortgages, money at interest and other different sources. Now the road fund does not get any benefit from the tax on mortgages. If they can get that tax, they can get just that much more than they are getting to-day. Not only that, but the cities and boroughs throughout this commonwealth pay state tax. When it comes back it goes not only into your cities and boroughs, but into the townships. In that way the farmer will be benefited.

Now there cannot be any question that the farmer is the most heavily burdened man in the state to-day. He does not pay taxes on money at interest directly; but if he is a borrower of money he has to pay indirectly; so that indirectly he does pay his money in that way.

Now a man's farm is valuable or not in proportion to its location, and it is the character of the soil, and everything of that kind, that must be taken into consideration. Its value is based upon what the farmer can make out of it. Is it not a fact that a man's farm is his income capitalized? Now that farmer is taxed, his capitalized income is taxed. I merely make the point, would it not be honorable if you should tax their incomes?

As to all these matters, I want merely to ask these questions.

And another point is this matter of state aid. How shall it go to the roads? Is it to be paid from the state treasury into each township directly, so that the officers of that township, if they see fit, can simply levy that much less tax, and not do any more work on the roads? Is it to be paid into the county treasury; when there, in what proportion is this money to be paid to the townships—in proportion to the population, or in proportion to the assessment value of the property, or how? All these questions are important, and this road commission wants light, and submits these questions to you, and would like to have them answered.

Mr. ROBERT IVINS of Bucks county. In reply to the gentleman's questions, in regard to working out the tax, I think the supervisors should have the power to employ help whenever they need it, and from whatever source they can obtain it at the right time. I have had some little experience in this direction the past year. The supervisor applied to me to help fix a very bad road about a quarter of a mile off, that I traveled about four times a week myself. In the spring he made the application. It did not suit me to do it, and I gave him that information. The road was neglected until October. He should have had the power to have repaired it, or he should have fixed the road; but he gave this to do and the road was not fixed until October, as I said, and you can judge what kind of a road it was.

Secretary EDGE. In answer to Mr. Gordon's question in relation to working out the road tax, I may say that from its organization, in 1877, until the present time, this Board has been a unit in opposition to the plan of working out the tax, and its influence and words has been used in favor of the payment of road taxes in cash. At different times the question came up for discussion at our meetings and was decided in the affirmative. Finally the question was referred to our committee on legislation with instruction to draft and present an act providing for the payment of twenty-five per cent. of all road taxes in cash. This draft of an act became a law and is now on our statute books; hence it is an error to suppose that the supervisors are not able to purchase imple-

ments with which to construct or repair roads; the act explicitly states that they may use the cash tax for this very purpose.

It is also a fact worthy of attention that the payment of taxes in cash does not prohibit the taxpayers from working out the road taxes, or rather for being paid for such work as they may do on the roads. In my own township (New Garden, Chester county) the taxes are practically payable in cash, but the roads are sold out to the lowest bidders for repairs; the adjoining land owners purchase the roads and keep them in repair for three years by contract; at the end of the year the taxpayer receives credit for the amount due him for repairing the road and charged with the amount of road tax; if anything is due him it is then paid; if anything is due the township it is paid to the supervisor; in like manner if under a system similar to the present one, the tax is payable in cash, the taxpayer can work on the roads and receive credit for that work, settling the balance at the end of the year, no matter upon which side of the account it may be. This I think covers the objection of Mr. Ivins, which is a valid one, and which should be considered in any change in the law, and no matter what changes may be made in the law, the taxpayer who is willing to fairly and honestly work on the roads, should have the preference over non-resident help, the idea being to give the supervisor more control over the character of his workmen, and hold him strictly accountable for the men.

Mr. EVANS of Chester county. In reply to the general question, how this money should be appropriated from the state treasury? I would say that it should be paid in ratio to the amount of money raised in the respective districts for road purposes. If the local taxation be three mills, let the state appropriation be in proportion; if the amount of this appropriation is such as will warrant a payment to each district of as much as it raises by local taxation, then let this be the proportion.

Mr. CYRUS GORDON. Then the worst districts would get the least appropriation, no matter how much appropriated.

Mr. IVINS. I do not think so. On this subject of the cash payment of road tax, in lieu of working it out, I would say that the cash payment of those taxes would be decidedly preferable to the plan of working out taxes, as it is done upon the road at the present time; because it is only an excuse for mending roads—they put in the time and accomplish nothing. I would also add that any farmer who sends his team and puts his men upon the road should be entitled to the same pay as any other person sending help to work on the road—that this commission should have power or authority put in their hands to contract or let the district to one man, or two men, or four men, or five men, to mend these roads and keep them in complete repair; or, when they cannot have it done in that way, to have it done in such other manner by residents of the township as shall be acceptable. It can be done cheaper by contract than by piece work, and where two men with a pair of horses and plough can do more in mending and repairing a road and keeping the drainage open than is accomplished now by the expenditure of thousands of dollars. In this district in which I reside, if I am not mistaken, there was collected from the resources of the town in one year \$5,800; and what was done with the money is a question, because there was no permanent improvements made in the roads of that district. Now that is a vast sum of money collected in one district, and the results of its expenditure ought to be perceptible. But go there to-day, and nobody could see where the money was expended to any great advantage, or whether expended upon the road. I have no doubt at

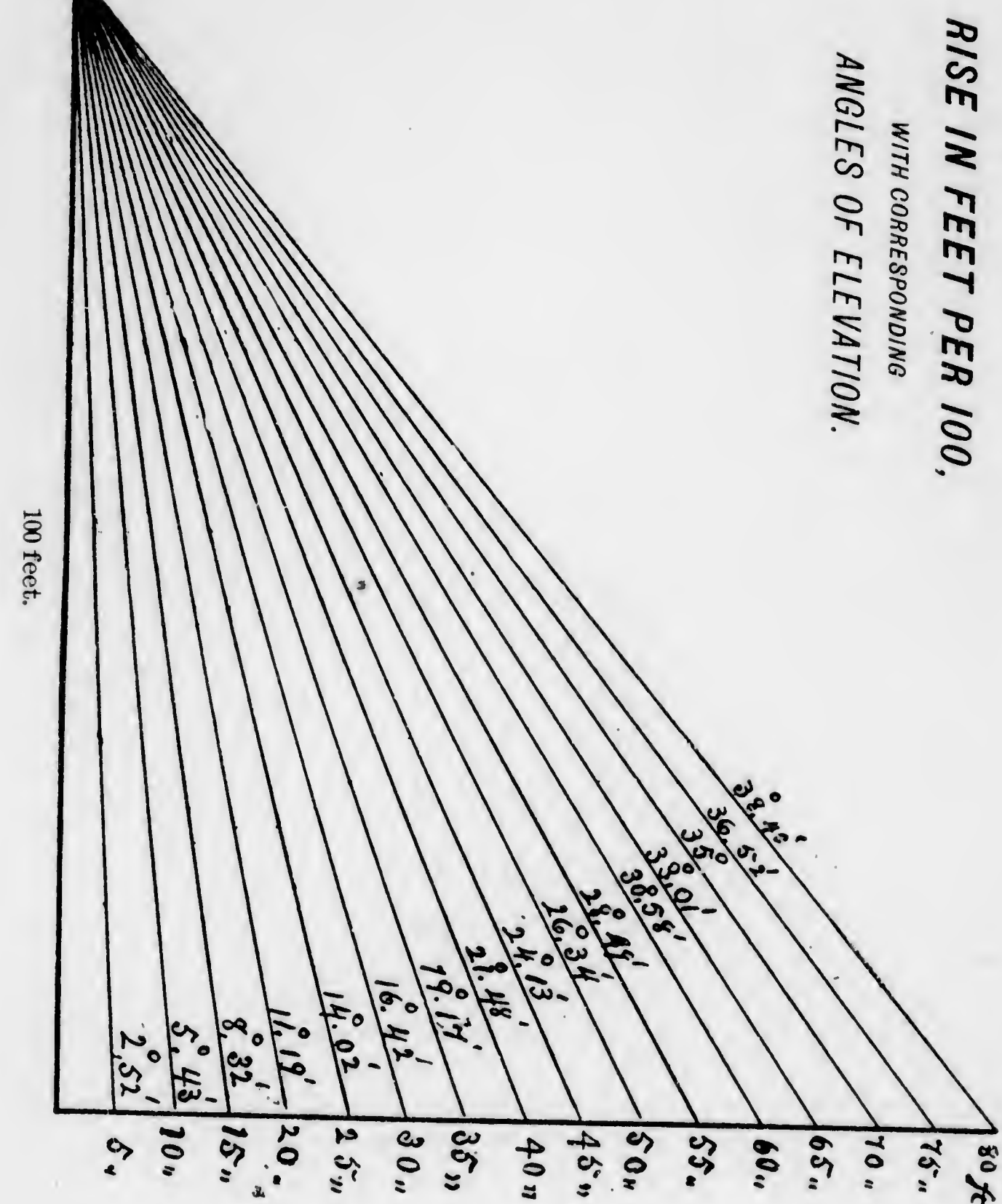
least that the past season has wiped it out—that it is obliterated—that there is no evidence of it there now. The roads are just as bad as before it was expended. As one gentleman has said, it is not a difficult matter to get hands enough to turn out on the roads and throw out all the mud into the middle of the road to remain there and dry until the next season, when the roads became as muddy, and the water is as effectually stopped from flowing as before. To prevent this there is no doubt that the mud should be thrown down the bank of the road. I think the proposed system of cash payments instead of working out on the road would be the best. I think the work can be done much better than by the old system of having men go out to work out their road tax.

Mr. MILLER of Lancaster county. The state appropriation I think should be regulated by the amount of money out at interest that pays a state tax. Say a district has \$500,000 out at interest, and pays a state tax that would amount \$1,500—that that district should receive its proportion of the amount of its money at interest; and so with each district.

Mr. CRAIGHEAD of Washington county. I had not intended to say anything. It is hard for any one to establish one side, when there are so many arguments in favor of the others, as I have found; for once when a boy I was put on a side, and before I got through I was on the other. And so you see I may get on both sides of this question before I am through.

As I did not say anything on the road law the fore part of the day, and the subject before us is on the construction of roads—although it has taken a wide range—I will commence with the road law. I think it should be changed. I think we have had a sufficiently long time of this way of working out road taxes—first, under the old system, and one supervisor in a township, and taking the whole township at one time, as we used to do when I was a boy, and sometime afterwards; for, when we started out with sixty or seventy men in one day, with a team of horses and a plough, we would go over miles of the road in a certain way—then and afterwards, under the old constitution, in the days of special legislation, when we got almost anything we wanted in a township.

Then we had this road system of three commissioners in a township, and selling out the roads. When that was tried in Cecil township, I favored the plan already spoken of here to-day. We districted it at the time; but it would not last. The three-commissioner system carried. I was in favor of collecting the road tax in money, and to have one supervisor, and hire day laborers whenever it was necessary, and the supervisor to be responsible for the road. It was not carried. We had three commissioners for a number of years. We became dissatisfied with that, and just before the new constitution was adopted we had the principle changed to the old plan, and our roads are worked in the same way they were worked twenty-five, forty and fifty years ago, when I was a boy; and then I may say it was not very successful. The supervisor will come around, and the men will say they want a certain piece of road. They can do it by the day or by the job, as they choose, and the supervisor is not there to attend to it. They go along and work a little on it, and he comes around and settles the account. If there is any complaint made to him, he says "sue the one who worked that piece of road." We have had some suits in our township on that account. We had a suit in our township that cost over \$1,000, where a horse fell down. Whether the case was brought rightly or not, it was claimed by one party that the horse was not on the road when he fell down; nevertheless we went to court. We have had several suits by reason of the road not being in re-



pair, but they were compromised. My belief is that there should be one supervisor in a township, and that the money be paid into the township treasury, being collected in a manner similar to that by which the school tax is gathered; and let it be under the same principle—all that is paid on a certain day to be subject to a discount of five per cent. Then the supervisor will usually have the money on hand to do the work when it is needed.

In regard to state aid, I have no objection to an appropriation. Some here seem to object to it. At first I thought probably we ought to pay all our own taxes in the community to make our roads. After hearing some arguments here to-day I have changed a little. I think it would not injure the treasury of this commonwealth any if there were an appropriation made for road purposes.

Then the question comes up: How is it to be distributed? In thinking over how it should be done, I am led to believe that it should be distributed in proportion to the amount they pay tax into the treasury of the state—I now have reference to counties—and then from the county to the township in proportion to the amount they levy for road purposes. So that the township that is willing to levy a sufficient tax to put its roads in fair condition would get an amount from the county which would assist very much in making the repairs to its roads.

As to macadamizing or piking the roads in Washington county we find obstacles in the way, on account of our having a pretty hilly country, and we have a great many streams there to contend with, and our roads break out here and there in the valleys. It would be a very expensive task to pike them there. Again, we have roads running alongside of precipices, where we have the slightest embankments; and to pike a piece of road of that kind and lose it all, either by the road bed giving way, or by the hill coming down on the top of it, would not be very encouraging to the township. Then we have had very high water in our county, and particularly so in the township in which I live. Last July or August a year ago—in 1888 it was—we had very destructive floods in our county—one in July in the vicinity of a stream called Buffalo, that cost our township and county an immense amount of money; another one in August on Chartiers creek that cost nearly as much. It was at one time reported that the Buffalo waters would entail an expense to the county for rebuilding and repairing bridges of over \$100,000. Consequently our taxes last year were increased one-third. If I make any mistakes, I hope that the presiding officer (Mr. McDowell), who is better in figures than I am, will correct me. I may say that our taxes were over one-third more last year in order to pay for the rebuilding of these bridges, without counting what our township had to pay for work on account of its roads being so terribly washed.

Now, there are townships where the land is more level than ours, and where they do not suffer so severely from washouts. There was one gentleman who spoke of keeping men on the road day and night. There were some men in our section who would have been glad to have had an opportunity for shelter during those terrible storms. They could not have stayed out day and night in the manner the gentleman intimates; because the rain not only took the roads, but the railroad along in its fury, and in the morning the rails and ties were standing up like a fence along the creek and along the road.

So we have a great deal of expense in our county to keep up our roads, owing to the hills and the kind of soil. Some parts of our county would not have stone enough to make pike of any length without bringing the

material from a distance. In other parts they might have. But I think if the money were collected, and the supervisor held accountable for the roads, then you might have a general supervisor of the county. I am not so particular about that. I think if the township is responsible for the roads, that the supervisor should be elected for only one year at a time; so that if he is not satisfactory they can change him—and the difficulty of making roads would be solved pretty clearly.

H. V. WHITE of Columbia county. Mr. President: I rise at this time to touch upon a question which has not been discussed. The difficulty in Columbia county is that too many roads are laid under the present laws. Some person who lives off on a hill, and has no road to his house, gets a few neighbors to sign his petition, which is brought into court and three viewers are appointed. He has probably suggested their names. They go there and lay out a road without regard to elevation or condition of the ground or absolute necessity, particularly if he is a man who can claim damages for going through his land and making a road, and is able to compel the township to build the road at an exorbitant expense.

We have but one turnpike in our county. We venture that we have as many miles of road, or more than any county in the state of its size. It is impossible for any supervisor, or any set of officers, to keep up the roads that we now have, they are so laid out or constructed that they cannot be kept up. We think that is a part of the law that should be amended first, so that when roads are laid out they will be laid out in such a manner and condition and location that they can be kept up and in good condition. The view in our district is (and the subject has been discussed considerably) that there should be a road commissioner, and that when a petition comes into court asking for a road, that that commissioner shall be authorized by the court to go upon the ground, examine the location and gather whatever evidence he can, and if he is convinced that a road at that point is unpracticable, to report his finding to the court, and that shall end it. If he decided that a road at that point is feasible, then the court to appoint a set of viewers. Let them be three or five, or whatever number may be fixed. Let them go upon the ground and determine whether the road is a necessity, and report their finding to the court. If favorable to the road it should be then laid out under the direction or supervision of this commissioner, but let him oversee or supervise his men. We think that this whole matter should be controlled by the court, as it is now, that the difference should be in having a commissioner who should have oversight of the entire matter, that we should still have one supervisor in each township, that our tax should be paid in money, and that we ought to have a certain appropriation from the state, and that that appropriation should be in proportion to the amount of tax we pay in each township, and that the money should be paid to the supervisor who is elected, and who is made responsible for it and responsible for the expenditure of it, and the responsibility for damages on those roads should remain where it is, with each township, that the township should see that its roads are properly kept up.

As to the matter of keeping up roads by having a few men employed to do the work, or having it worked out, we have an illustration in our county. Conyngham township has a corporation that owns a majority of the land. In 1872 it obtained an informal contract with the taxpayers of the township, under which it agreed to keep and maintain the roads in a good condition, and that the supervisor should simply be a

figure-head and have nothing to do with the roads. This contract was to last for five years with the firm of L. A. Reiley & Co., and they went to work at once and expended a large amount of money to repair the roads in Conyngham township over those mountains. They took the tax that came to them from the other taxpayers and it soon became evident that they were not using even that small moiety of tax from those taxpayers to keep those roads in repair, and it became so evident that everything was going into the hands of L. A. Reiley & Co. that they became jealous of them, so much so that last year they came into our courts with a complaint and petition asking that this system be stopped. I only give this illustration as showing that the roads can be kept up at not much more than one-fourth what we pay now.

Out of our town of Berwick we had a road twelve miles long, very sandy and heavy, running through four townships in those twelve miles. Our township and one other macadamized the road with cinder and limestone. Our township macadamized the road in 1870, I cannot say just when the other had it done. Our township has never, from that time to this, expended one dollar on that road. You can tell to-day, on driving from Berwick to Bloomsburg, the moment you strike our township line, and you can tell the moment you strike the sand that is shoveled on every year, costing more than ours did originally. We used cinder from the furnace there, but the limestone they quarried. We macadamized a road through a bog that we were obliged to fill in with three feet of cinder, and fifteen feet wide, for half a mile, and covered that with six inches of limestone on the body of the road traveled. We made that road in 1876. That road stands just as it did then, without a dollar of repairs for any purpose. It is just out from Bloomsburg, and it was stated that it was impossible to make a good road through that bog, yet it was made in that way, in some places three and a quarter to three and a half feet deep with cinder, and covered with limestone.

Mr. ATKINSON of Montgomery county. Mr. President, perhaps the members of this Board, as are all the persons here, are in favor of macadamizing our county roads. You know there is no way of doing that without having the farmers pay for it. Well, it is not worth while for us to advocate macadamized roads and expect the farmers of this commonwealth to pay for them, because they do not intend to do it, they are not ready to do that. If you want them to do so you must educate them up to a knowledge of the economy and desirability of such roads.

Now, of course, we who are here all know that macadamized roads in this commonwealth would be economical, that is, if we can afford to make them. Every farm of one hundred acres, taking that as the average-size farm in this commonwealth, could do with at least one horse less on the farm if we had good solid roads all over our townships. You cannot maintain a horse on a farm for less than one hundred and fifty dollars a year. Now, every farm of one hundred acres paying one hundred and fifty dollars a year would, in the course of ten or fifteen years, macadamize all the leading roads of the township, and do it well. But before you can do that you must teach the farmers that that is the case. That has not been done, and it is not likely to be soon.

Now, in our township we have dirt roads, and they are mended with a road scraper in the spring just before corn planting, but it is not well done. If our township were to elect an enterprising man and he were to go to work and thoroughly repair those roads with scraper and picks and shovels, and put that expense upon the township, if he were to do that one year he would simply be voted out and somebody else put in who

would not be such a heavy charge for road mending. How will you macadamize roads in such a township as that and put the expense upon the farmers? You simply cannot do it. You must educate them up to a knowledge of the economy of it, and the desirability of it. Our roads are only half mended. The water courses down the middle, and the supervisor comes along, or one of his assistants, fills it up about level, or nearly so, and it is soon very nearly as bad as ever, whereas if he would run it up so that the water would drain off into the ditches, there would more likely be a road-bed to travel over comfortably. Now, until we can accomplish that it is not worth while to talk about stone roads, because the farmers are poor, and they do not intend to pay for them until you make them believe it is to their interest to do so.

Mr. EPHRIAM HOOVER of Lancaster county. I have been listening to this discussion with a great deal of interest. I think it is one of the great questions of the day—a question that certainly concerns all, and one that we cannot take up too carefully and discuss too thoroughly. It appears to me that there are some parts of this subject, and some ideas that have been advanced to-day, that cannot be practically carried out, yet I am glad that this question has been handled as ably as it has, and discussed from different standpoints, and by representatives from various parts of the state. The views of many localities have been brought out, and by this means we may eventually arrive at something that will be very beneficial to us all. But it occurs to me that this matter of macadamized roads is something that is not applicable every where, and cannot be put to practical use. It seems that in some localities it would cost entirely too much to have it done. For instance, you take townships, or you take counties where stone are very remote, and it would cost a great deal to build there on account of transporting the material. It appears to me that the expense would be so enormous that it would be impossible to do it. I am therefore opposed to macadamizing in such localities. I am also opposed to macadamizing where stone are plenty—that is, where there are a great many roads, and roads that are used very little, and that would not justify doing this. But the main roads, the thoroughfares that are used to transport goods to railroad stations, and a number of others that I might mention, I am heartily in accord with them being macadamized; and it appears to me that in the long run it would be the most profitable way of getting over this difficulty. But as I am only in accord with these, I will of course confine myself just to these most important and necessarily frequently traveled roads.

Now, it appears to me that our present system, or our supervisor system, could be very much improved in this way, and I throw out the thought: Our present system, it seems to me to be, to a very great extent, useless, and it brings a very poor result. As has been repeatedly said here, in the spring of the year the supervisor goes over the public highways; he takes a body of the citizens of the township, and they repair the roads, and when that is all done they retire again, perhaps for a whole year, and never look at the roads unless they are particularly notified about some bridge, or a more than ordinary break, in the way of great washouts, or in the washing away of bridges, or some thing of that kind.

Now, have one or two townships in Lancaster county whose supervisor makes it a business to look up the roads all summer and fall; and the expense is much less in keeping the roads in repair, and having them

repaired in the fall of the year, than in the spring of the year, for the reason, as shown, that you can prevent a good deal of washing by having them in proper condition before the winter sets in. He goes over the roads, but has no more men than are necessary to keep them in good repair, and, if anything is wanted, it is attended to, very much on the plan that "a stitch in time saves nine." On the very principle that a careful farmer, as soon as he sees a strap injured, or a buckle pulled off, will at once repair it. He knows at once that a little neglect, or an unnecessary delay, will cost a new one; and just on the same principle that a man will be appointed by the court, or elected, who makes it his business to attend to the roads and nothing else; that it is his business to employ as many as are actually necessary to do the work, and to have it done well. It appears to me that this is one of the important features about this. We can get something better. If we do nothing more, we can improve on the system of road building by having our roads well looked after throughout the year, and have the work promptly done on our highways. I am glad to hear so many sentiments expressed here from different parts of the state. I hope the results will be satisfactory to every section of our great commonwealth.

Mr. CALVIN COOPER. I have four pointers. I think they express the sentiments of all the gentlemen present from the different parts of the state. They are as follows:

1. Repeal the privilege of working out the road tax.
2. Require the road commissioners or supervisors to employ the necessary labor where they can get the best value for the money expended, giving the preference to resident labor.
3. Require other property of equal value with real estate to pay its proportion of the necessary tax.
4. Have some efficient head in each county to supervise and prepare plans.

I respectively submit them, and, if approved by this body, will give them to the commission in compliance with a request made by one or more of its members here to-day.

Mr. McCARGO. Mr. President, it seems to me that the burdens of the farmers are all they can bear, and that if the roads of the state are to be improved you must have some state aid. Therefore, I think that each member of this association should bring his influence to bear upon the member of the legislature from his district, and urge him to vote for state aid, no matter what bill we may formulate. Unless the legislature chooses to act on it, we will accomplish nothing. Therefore, if you want any assistance, you must get your members to help you out.

Secretary EDGE. Mr. President, I dislike very much to break in upon the discussion of this topic especially as I see by the attempts of gentlemen to obtain the floor, that there are others who desire to be heard, but it is now near the time of adjournment as fixed by our programme; I am aware that in order to make railroad connections some of our members will be compelled to go home at the close of this session. But there are a number of delegates and members of the Board now present who will be unable to leave for home until to-morrow morning; we have, by special agreement, allowed those who were compelled to leave, the first right to the floor; I would, therefore, suggest that, if there are a sufficient number who will remain and participate, we hold an evening session, to commence at 7.30 P. M.

The PRESIDENT. I think that the statement just made by our secretary,

if reduced to a motion, would meet with the cordial support of all those who expect to remain.

Secretary EDGE. I therefore move that we have an evening session to commence at 7.30 P. M.

The motion was placed before the meeting and adopted unanimously. The Board adjourned at 5.40 P. M.

Board called to order at 7.45 P. M., Vice President McDOWELL of Washington, in the chair.

Secretary EDGE. From the number who were endeavoring to obtain the floor at the close of this afternoon session it is very evident that we will not be able to reach the conclusion of the road question either at this session or at this meeting of the Board. I, therefore, move that we first have the two essays (by Messrs. KRATZ and REEDER) and then proceed with the general discussion until the time for adjournment.

Agreed to without a division.

EASTBURN REEDER, member from Bucks, then read the following paper on Cross-ways and Ditches:

CROSS-WAYS AND DITCHES.

By E. REEDER, *Member from Bucks, New Hope, Pa.*

The pleasure or pain we experience in riding over our public roads depends in a great degree upon the proper construction and location of the cross-ways. Some of our modern roadmakers go so far as to condemn all cross-ways in roads. The object of the cross-way is to arrest the flow of water and convey it into the side ditches. Roads on which these cross-ways are not made will require considerably more rounding up of the surface of the road, than is necessary in roads containing them. The surface of all roads should be more or less rounded up, according to circumstances. When the surface of a road gets to be flat, or concave in the middle, it is then in a condition to become bad, or worse, with every rain. Roads should be constructed with this object constantly in view—to get the water out of the road as soon as is possible. The longer the distance water has to run over a road surface, the greater will it be its volume, the harder will it be to manage, and the more damage will it do. Even with our side ditches, made expressly for the purpose of carrying water, the water should be got rid of, or let out at every opportunity.

As an experiment in dispensing with cross-ways, I well remember when the hill north of Langhorne, Bucks county, used to be terraced with them every few yards from top to bottom. In riding over this road recently while attending our county farmers' institute, I noticed the cross-ways were all taken out, and the surface of the road quite rounded up in the center, and the hill was never in better condition notwithstanding the extremely rainy season.

There is a principle underlying the proper construction of cross-ways that I have frequently observed, and as often wondered why it was not applied. The height or length of rise of the cross-way should bear a certain proportion to the circumference of the wheel, and the length of the coupling pole of the carriage. For our ordinary carriages with

wheels four feet in diameter and a coupling four and a-half or five feet long, the length of the rise of the cross-way from the lowest to the highest point should not be less than six feet. In other words, when the hind wheel of the carriage has descended to the bottom, or lowest point of the cross-way, the front wheel should be still ascending, should not yet have ascended to the highest point or top of the cross-way. Over such a cross-way as this, our carriages will roll easily and smoothly. There will be no sudden strain upon the coupling of the carriage, nor upon the unguarded backs of the occupants of the carriage. Our modern cross-ways are constructed similar to saw logs placed across the road and barely covered with dirt. When the front wheel of the carriage begins to descend the opposite side of the cross-way before the hind wheel has reached the bottom of the opposite side, there is such a sudden elevation and descent that is both hard upon the carriage and distressing for the occupants.

Our cross-ways, therefore, should be gentle swells in the road surface with an ascent of at least two paces, and a still longer descent. The crossing of the ordinary supervisor is made so that he can step over it at a single stride. In riding rapidly over crossings thus constructed the effect is suddenly produced, and the consequences longer remembered. They are moreover very trying upon the temper of the pleasure seeker. The cross-way should not be made straight across the road, neither should it be placed obliquely for one wheel to cross at a time, it should be crescent-shaped, taking care to have the convex side, the right side up, that is, up the hill, and not down. The former will turn water from the centre of the road, while the latter will conduct it to the centre. This is, as the boy said when he wrote his first composition, "all that I know about cross-ways." Of side ditches but little need be said. They are water courses, and the water should be turned out from the road at the first opportunity. In long hills where the road bed is lower than the land upon the sides of the road the water often has to be conveyed long distances before it can be got rid of. In such cases the volume of water frequently becomes great, it is harder to manage and the damage done correspondingly great. The size of the ditches both in width and depth should bear a corresponding proportion to the distance it has to be conveyed. Sometimes this distance is so long, and the volume of water so large that the ditches are washed dangerously deep. If the bottom of our side ditches could be kept in sod the danger from washing would be much decreased. Whether it would be economical to pave the ditches with plank or stone is more than I am able to say. But in all cases where the side ditches become deep, fenders should be erected to protect the traveller from danger. Supervisors of roads are liable for damages where such precautions for safety are not taken. In conclusion I would say that our roads should be so constructed as to keep the water off as much as possible, and the ditches should have outlets at every chance. The law of our public roads, I believe, authorizes the supervisors to do this, and the dangers from damages to private property by washing be rendered correspondingly less.

Hon. H. W. Kratz, a member from Montgomery, then read an essay on "Good Roads a Mutual Advantage to Town and Country," as follows:

GOOD ROADS A MUTUAL ADVANTAGE TO TOWN AND COUNTRY.

By H. W. KRATZ, *Member from Montgomery, Norristown, Pa.*

"It is an axiom that the prosperity of any city, town or village depends largely upon the surrounding country." The more populous the adjacent and tributary territory the larger its trade, and the more rapid the growth of the city. And it is a truth that should not only be recognized but acted upon, that the better the roads the faster the country develops in population and wealth. Hence, good roads are of mutual advantage to town and country.

The tendency of business men in modern times is to settle in the suburbs of a town for home comfort, where the air is pure and healthful and where the roads are smooth, solid and shaded by trees. The beauty and delight of such a place where nature's handiwork dwells on every hand, and where the roads are avenues of pleasure, invite from the city the admirers of such scenery and comfortable rural homes. But what would acres of Eden-bloom and forest-glory be worth to that class of persons, if in the midst of such suburban grandeur, the highways should be neglected and again become the common road of mud and dust. The result would be that they would return to the city mortified and discouraged, because they had not only been deprived of their country comforts and pleasant drives to and from the city, but also because of the shrinkage of property valuation, by reason of the loss of good roads. Many of the former advantages to that section of the country in such a case would, in a great measure, be lost. Such a retrogression, however, does not often occur. People are too anxious to retain the macadamized highway, which affords them so much benefit and pleasure.

The rise in value of land in those portions of Montgomery and Delaware counties, lying near to the city of Philadelphia, is to a large extent due to the construction of good roads, which have greatly enlarged the territory suitable for suburban residences. Millions of dollars have thus been added to the wealth of those counties. In other parts of this state there are farms from eight to ten miles from any town or railroad, whose value is at a minimum, not because of any lack of fertility, good buildings, or any other thing which makes a farm inherently valuable, but simply because of their inaccessibility through the poor roads. If located near a good road those farms would at once become more valuable. One might as well live on an island as on a farm that is practically cut off from town, railroad and postoffice by bad roads during at least four months in the year.

It is sometimes argued that the enormous expansion of our railway system has led to a corresponding neglect of our ordinary roads, that we are no longer dependent on wagons and horses for the transportation of freight and passengers from city to city. This assertion furnishes no good reason for neglect of roads, for generally the country roads are branches, by which the rills of traffic are gathered to join the rivers of commerce that pour along the iron-ways, to render the traffic advantageous and remunerative. It is an indisputable fact that ninety-nine per cent. of the freight that is transported by rail or water, has to be hauled over a road or street to the railroad station; and the same is true of the freight after it reaches its destination. All our trade organizations in natural products must find their way over a highway before

they can reach a market and obtain their value; and, therefore, good roads at all seasons of the year are a necessity for the greater prosperity of town and country. And I can see no reason why the common road system should not in some degree, at least, receive the same kind of attention and concern, which the development and improvement of the railway and steamship systems have received. In the advancement of railroad and steamship transportation are the desires of man absolutely supplied. And here and there are his desires gratified in regard to the character and condition of the public roads. It has been said "that the progressive nature of human desires is in no way more distinctly marked than in the endless carrying to and fro of goods, which are required to meet the needs or fancies of man, that with each successive stage in the advancement of civilization, we find a progress in the *desires*, which brings about a need of transporting the products of the earth for greater distances; and that at the present day our civilized men cannot be content in their daily lives, without assembling for their use the products of the earth, and thus it comes about, that the ways of communication, created by man, are at once the measure and means of civilization." And upon this principle the country roads, whether good or bad, must continue as among the chief avenues of communication, and as such they are of immense importance, especially to the farmers, who chiefly make use of them. The saving in cost of transportation, which a good road makes over a poor one, is much greater than most people suppose, and the cost often determines the question of profit or loss.

In the census of 1880 an attempt was made to get a fair estimate of the average cost of hauling grain from the farm to the railroad station. The estimates returned varied greatly—from thirty cents to two dollars—for hauling one hundred bushels one mile. But it appeared that the average cost of hauling one hundred bushels one mile was sixty cents at least. In most of the western wheat regions it was stated that if wheat has to be hauled more than eighteen or twenty miles to reach a railroad or water, this land carriage, in ordinary years, eats up the profits of culture. According to the estimates received, it costs the ordinary farmer more to carry each bushel of wheat a mile than it does the ordinary railroad to carry a ton.

When one thinks of the hundreds of millions of bushels of wheat grown in this country, practically all of which, except that saved for seed, has to be transported over country roads, a distance of several miles on the average, and when one adds to that, the more than 2,000,000,000 bushels of other grains produced annually, a large proportion of which is transported over these same bad roads, the importance of good highways, and the grain arising from building them becomes manifest. The farmers should reflect that the gain would come largely to him.

This matter of hauling at a heavy expense has excited a great deal of attention in the western states, and some interesting estimates have been made by experts in Illinois. A state whose topography is generally level and would therefore seem to be favorable to good roads. These experts calculated that for two-thirds of the year not more than one-half can be hauled, of what in the best season is considered a good load. This means, that a horse whose earnings would be \$150 a year on good roads, can earn only \$100 on poor roads. Professor Ely has estimated that poor roads cost the farmer on an average at least \$15 per horse a year.

Clemens Hershel, a Boston engineer, in comparing American with English roads says: "The English horse employed in the streets of a

city or on the roads of the country, does twice as much work as the American horse similarly employed in America. The simple explanation is, that the Englishman has invested in perfect and permanent roads, what the American expends in perishable horses that require to be fed." In Gilmore's "Practical Treatise on Roads, Streets and Pavements," the following table resulting from trials made with a dynamometer attached to a wagon, moving at a slow pace upon a level, is given to show the force of traction in pounds upon several different kinds of road surface in fair condition, the weight of wagon and load being one ton of 2,240 pounds.

On Telford road,	46 pounds.
On road covered with six inches of broken stones laid on concrete foundations,	55 "
On road made with thick coating of gravel laid on earth, from 140 to	147 "
On common earth road,	200 "

This shows that it requires three times as much force to pull a load over a common country road as one macadamized and more than four times as much power as on a Telford or one of broken stone on a concrete foundation.

When it is remembered that through the greater part of the year, the country roads are in poor condition, some idea may be gained of the immense loss in horse power which they cause to the farmer. It is plain therefore, that when the roads are so improved that a farmer can get over fifteen miles of good road with no trouble and expenditure of horse power than is required over ten miles of bad road, that five miles have been added to the territory tributary to the city's market, and that the advantage is therefore mutual between town and country.

But in the face of these facts, it seems that the solution of this question must in a great measure be solved by long and constant agitation and labored effort, to show by mathematical demonstration that good roads are advantageous and economical. This method of molding and educating public opinion to such needed reform, seems inconsistent and reprehensible. But as long as people are so willing to endure the great inconvenience and loss which they sustain from the mud road, the prospect for road reform is not bright, and educating the people upon this subject must continue. This inexcusable and pernicious method of road-making and repairing from year to year without a particle of improvement, is beyond one's comprehension or reconciliation, and can only be explained, if explained at all, upon the erroneous principle of cheapness. It has been demonstrated time and again before this Board, by men who have gathered statistics upon this subject and by articles published in newspapers and periodicals that a mud road is the most costly and unsatisfactory road that can be constructed. And notwithstanding that the needed information has been furnished as to the true methods of constructing and repairing the public roads and the experience of those who enjoy good roads, given of their satisfactory results, still men seem to prefer the mud road, simply because they regard it as cheap and good enough.

It will not do to say, that the mud road is the ideal of the ignorant; for the truth is that the worst roads exist among the intelligent agricultural portions of the country. To reach this conclusion we need but travel the roads where the farms are the most productive, and equipped with the best of everything that is needful, and where the traffic is large and important. The farmer of Pennsylvania does not act in this manner upon any subject embraced in agricultural pursuits. He purchases

labor-saving machinery as rapidly as the inventor supplies the market. He invests his money in farm appliances without stopping to debate the propriety or expediency of his action. He comprehends with wonderful aptness the benefits of machine and stock improvement. He does not hesitate to plant a wind pump into a distant spring so that he may conveniently draw an abundant supply of fresh and good water to the barn for his cattle.

As a rule he is noted for owning the best horses, cows, sheep and swine. He could not be induced under any circumstances to drive a mean horse or keep a worthless cow. His farm buildings are generally substantial and comfortable. In short, he keeps pace with the improvements of the times and is generally in line in the onward march of progress. Daniel Webster in a speech delivered at Boston, in 1840, on agriculture in England, said "that the farmers are the founders of civilization." This declaration stands as an uncontradicted truth to-day. We concede also that the energy, intelligence and industry of the farmers have given impetus to the growth of the country in improvement and wealth. History asserts that civilization everywhere commenced in the formation of agricultural societies. These societies have spread information upon important agricultural and other questions all over the civilized world, and by their efforts have contributed largely to the development of the state and nation. Many useful and important enterprises have been fostered and multiplied to such an extent that the enjoyment of their benefits is almost universal. And if a system of good road construction had been included among their past achievements, we would to-day have better highways throughout the greater portions of this state. But unfortunately the neglect of the past has become the necessity of the present; and because of that neglect, the task has become a question of greater magnitude and cost. At this time it is also a question of some embarrassment because the present is the most inauspicious time to heap additional tax upon the farmer. And this may be one reason why even the progressive farmers are not everywhere actively engaged in the most-necessary and much-desired improvement. We also find the same condition and character of roads which apply to the country to exist in some of the borough streets of this state; where professedly the inhabitants pretend to be far in advance of the country in every respect.

And yet it must be said to their shame, that too many of the streets are no better than the mud roads of the country; all of which is due to the lack of liberality and town pride on the part of town authorities, and the apparent ignorance on the part of those who have the construction and maintenance of streets in charge. It is amazing to see what unfitness there is among men serving the capacity of street commissioners; they appear to have no correct idea of the quality of the material required for road use, no judgment or knowledge as to its proper preparation, and little or no conception as to its correct application upon the streets. It would seem from the manner in which many of them do their work, that they really believe that two or more large uncracked stones can occupy the same place at the same time and remain there. They do not appear to know that open spaces are created between the larger stones composing the first layer upon the street bed, and that those spaces should be supplied with smaller stones, and so on, using still smaller stones, until the material is ready to be consolidated and packed, in order that a dry and smooth street may be the result. Now the same inefficiency that prevails among street commissioners in many

boroughs, is found among the supervisors of townships. In order that we may have beneficial and satisfactory public roads, men should be elected supervisors who have acquired a knowledge of road construction through their own observation, from the experience of men who have been engaged in the work, and from actual study of the different methods of making and repairing roads, who possess some engineering skill, and who are willing, whenever sustained by the people, to exercise the power conferred upon them by the road laws of this commonwealth, to make and maintain good and respectable roads. The position I took in my former paper "On the Construction and Maintenance of Public Roads," as to the legal powers possessed by supervisors to construct good stone roads, and their duty to do so, has been confirmed by a judicial decision given in the following case:

Judge Yerkes, of the Bucks county court, recently delivered an opinion in a case involving the rights and duties of road supervisors, which is of general interest. On the demand of certain taxpayers of Bensalem township, Moses Vandegrift, the supervisor, made a contract with them for making a good and substantial road bed upon a specific part of the highways of the township, either by macadamizing the same, or by the use of stone and gravel, or in such other ways as shall be deemed advisable and proper, and make and construct a road and highway, so that the same shall be a permanent benefit to the township.

The work appears to have been done to his satisfaction, and the cost thereof was claimed as a credit against the amount charged to him upon the township duplicate. The cost, according to the contract, equaled the amount of taxes due to the township from the taxpayers, with whom the contract was made. The township auditors disallowed the credit, on the ground that the supervisor exceeded his authority in making such a contract. Judge Yerkes said: "The statute defines the duties and powers of supervisors. It contemplates that the roads shall be kept in permanent repair; that wood, stone, gravel and sand shall be used for such purpose, and that the supervisor shall, when it can conveniently be done, make contract for such repairs. Of course he cannot make his contract in such a manner as to deprive any taxpayer of his right to work out his own taxes. The contract in evidence is clearly within the law, and it is such as the supervisor had the right to make.

"It was also for the making of such a road as the law contemplates, and of the materials mentioned by the act. It is true, it might result in making a better character of road than is usually provided by the ordinary supervisor, but no better than the statute intended should be made. Instead of making such improvement to the roads as will keep them constantly in repair, and at all seasons clear of impediments to easy and convenient traveling, it is usual for the supervisor to make a pretense of repairing the roads by throwing upon the hard bed, from the side ditches, loose earth, unbroken rolling stones, and whatever other material, suitable or unsuitable, may be found in the ditches along side, without reference to the condition of the road, or the necessity for repairs or filling up. The consequence is, that often good roads are made worse if not nearly impassable for a season, while poor ones are neglected, simply because the immediate side ditches do not furnish suitable materials to repair them with. The short-sighted and too often useless system of repairing roads, is frequently approved by the taxpayers for two reasons: First, because supposed to be inexpensive, and, second, it permits him to work out his taxes without being required to furnish valuable material, or provide the better labor that a different method would

demand. But it is really both expensive and wasteful. It is expensive because not lasting. Much earth is thrown out where it is injurious rather than beneficial, and is soon washed away or ground up in quicksands, necessitating a repetition of the same ineffectual work. The method thus commonly practiced on our roads is not the lawful one; it is but temporary, whereas the law requires that the work shall be effectually done, and of a permanent character, so as to keep the road in constant repair.

"If, instead of this ineffectual method, a portion of the highways of each township, where most needed, would each year be put in a state of permanent improvement, with such temporary repairs only as are needed to other portions, in a few years the same expenditures would result in establishing a system of safe, good and permanent roads, which would not require half the expenditure incurred by the system now practiced.

"We think the conduct of the appellant showed a purpose to comply with the law and to build the road well and as directed so far as he went. The same good judgement another year would improve other roads in like manner, and eventually the township would be greatly benefited. Instead of being condemned and put to loss he deserves to be commended for good sense and judgment, and as it is not alleged that he showed favoritism it is difficult to understand the purpose of the auditors in refusing to allow him a lawful credit. And now, to wit: August 13, 1889, the appeal is sustained and the proceedings of the auditors of the township of Bensalem set aside, so far as they refuse to grant appellant exonerations for the road taxes for the year 1889, charged, assessed and levied against Craig Biddle, trustee of the estate of James M. Biddle, *et al.*, taxpayers of said township."

The supervisor in this transaction reminds me of the following incident which occurred in France: "Napoleon, the greatest roadmaker that ever lived, when he came into power saw at once that to transport his armies over the played-out paving of Roman roads in France, and to have his men when they arrived at the fortress in any sort of fighting condition, his cavalry not all lame, his artillery and baggage not a line of wreck from Paris to the frontier, there was simply one thing to do and he did it. He tore up the paving, converting it into fine stones with which he renewed the surface underneath by mixing the smaller stones with gravel and chalkey substances, or else he used the paving as a road bed and laid his surface of fine stones on the top of it. In this way he made those absolutely perfect highways which stretch from one end of France to the other. He then gave the control of the roads into the hands of the government officials, who have kept them well to this day." It is said that France has 200,000 miles of road, and of these more than 120,000 are macadamized. As Judge Yerkes interprets the law in the case just cited, every essential requirement for the construction of good roads is contained in the statute now in force. And therefore there seems to be no necessity for the enactment of a more stringent road law unless it would be to provide a penalty for the punishment of persons who array themselves against supervisors for the lawful and faithful performance of their duties. We must remember that it is no fault of the law that bad roads predominate. The silent force of the law is of no avail. It only becomes effective and beneficial when executed, and any road law will be a dead letter if the people will not furnish the money wherewith to pay for the construction of good roads. Supervisors cannot construct lawful roads without money. No one, however, wishes to oppose the effort to revise the present road law and give the revised act,

if passed by the legislature, a trial. The real difficulty is that people are unwilling to have roads constructed as the present law contemplates and provides. And while it is the duty of supervisors under their oaths and functions of office to construct legal roads, it is unreasonable to expect them to change roadmaking methods without the assent of the people. Especially is it unreasonable to expect them to do so, when, after one has performed his duty faithfully and well, he is denied the money which the law appropriates for road purposes, and is compelled to appeal to a legal tribunal for protection, and can only get the money due him by an award in his favor from the court.

In most localities people practically prevent the construction of good roads either by refusing to elect men for supervisors, who, if elected, would improve the roads, or by defeating at the succeeding election those who, by reason of having bettered road construction, increase taxation.

For an increase of tax to the amount of ten cents on one hundred dollars, and even less, because of road improvement, a supervisor would be overwhelmingly defeated in many of the townships of the state.

In very sparsely settled portions, where traffic is small and unimportant, and the roads but little used and therefore comparatively good, no one expects to apply the most improved and expensive methods of making and repairing roads. But we do say that in the flourishing and busy sections of this great state, where there is abundant wealth, thrift and business activity, the people should be willing to make some personal sacrifice, if required, for so great a public necessity as good roads. If the benefits and advantages derived from good highways were a matter of doubt, and if they existed here and there (as happily they do) without the most satisfactory results to town and country in a commercial and social point of view, then there might be some force in the objections urged against the kind of public roads which the progress and civilization of the times absolutely demand. The question of systematic road construction is one so closely related to every material interest of the state as to place it among the most important questions of public economy. In a newspaper article a few days ago it was stated that "the cold weather which visited the western states was followed by improved trade at all the leading western cities. The reason of this is that the frost made the roads passable for teams and the country store keepers proceeded at once to replenish their depleted stock. The wet, warm winter has played havoc with dirt roads everywhere, and outside of the cities there is scarcely any other kind. In this last decade of the nineteenth century the people of the United States are still dependent on either the sun or the frost to give them tolerable roads, and when there is too little of both, as there is every spring and fall, and this year and winter, trade stagnates for want of the elementary means of communication. The claims of this country to be a highly civilized nation will admit of challenge until it gets roads that can be used with equal facility in summer and in winter, independent of sunshine, rain or frost."

Now, as soon as the people can be persuaded that by building macadamized roads or roads of that character they will receive full value for the taxes they pay, and, until on the other hand they have discovered that for the taxes they pay for keeping mud roads they get nothing permanent or satisfactory, will the roads be improved. And even then I doubt whether it will be done promptly and well unless state aid be furnished. It would be just as commendable and magnanimous for the state to assist the people to some extent in this matter as it is in giving

aid upon the question of education. Every school district in the state receives an appropriation for school purposes, and in order to make that aid effective, the state should help to reconstruct the roads so as to enable children to reach the school house with comfort and ease, for in many places it is absolutely impossible for those who cannot be conveyed there in teams to attend school at all during the latter part of the school term. The result is that not only school houses but churches also are comparatively empty in many localities during the winter and early spring by reason of bad roads. Good roads would, therefore, promote not only the educational but also the moral and religious interests of the people as well as their pecuniary and commercial advantages. The neglect to provide the needful opportunities and conveniences for the moral and intellectual training of the young creates a responsibility which must fall somewhere, and it is well to consider this question in that aspect, and to endeavor to devise a plan by which that responsibility will be lifted from the shoulders of those upon whom it may rest. Under the present law the desired result could gradually be realized by constructing as many miles of stone road annually as a reasonable assessment upon property valuation and the amount received from the state (if appropriated) would permit. The state appropriation should only be given, however, upon the condition that supervisors of each township construct a certain distance of road each and every year. I believe that the present road law, if not repealed, should be so modified as to annul the clause permitting taxpayers to work out their own taxes, because the work done by the taxpayers, as a rule, is performed without knowledge or care; and if practicable to establish some standard of qualification governing the election of supervisors, and that there should be but one in lieu of two in each township.

Let us hope that the labors of the commission recently appointed by the Governor of this commonwealth to revise and consolidate the laws relating to road improvement will result in accomplishing the object which has prompted the appointment, and that the outcome of the effort will be either the modification of the present road statutes or the formulation and enactment of such a new and effective road law as will meet public favor and the establishment of a system of enduring and creditable highways throughout this state, which will add another item of public improvement to our history of advancement and progress.

Vice President McDOWELL. The question is now open for general discussion, and we will first hear from Mr. Critchfield, a member from Somerset.

Mr. CRITCHFIELD of Somerset. I do not now remember what it was that I wished to say when I yielded the floor to another at the afternoon session, but I will say, however, that one of the defects existing in our present road laws is the want of some better method of confining the number of new roads within proper limits. There can be no question, but that under the present law many new roads are opened to be maintained at public expense, which ought to be, and no doubt could be, avoided. By this means our road taxes are unnecessarily increased, and a constant drain is kept up upon the county treasury. There are many counties in which the amount that is annually paid out of the county treasury for viewing and laying out new roads, runs up to several thousand dollars. This may be a difficult matter to control, but while we are offering suggestion to the commission appointed to revise the road laws, it may be well to direct their attention to it, in the hope that they

may be able to devise some plan by which much of this outlay of money may be avoided.

Another thought that has come to my mind frequently during this discussion is that we would be much better qualified to offer suggestion relative to the work in the hands of the road commission if we knew just what is going to be done by the commission that was appointed to revise the revenue laws of the commonwealth, unless the farmers of the state are relieved from the inequalities that at present bear upon them, on account of the unequal distribution of the burdens of taxation, they are not prepared to undertake any very extensive improvement of our public roads. The tax burden is already as heavy as farmers can bear, and if there is to be any increased expenditure for the improvement of roads it must be provided for by state appropriation. I cannot see any reason why any one should object to asking for state aid in this work. It is only another way of helping ourselves, for we can make no distinction between the people of the commonwealth and the commonwealth itself. This will certainly be the most effectual way of laying a part of the road burden upon other property than real estate, which under the present law has almost the entire burden to bear. And with regard to the manner of distributing the aid received from the state, if this should be the plan adopted, I cannot agree with the gentlemen who suggest that it should be either according to the population, or the amount of money raised by taxation in the respective counties or townships of the state. There are many very populous districts where they have but few roads and where but few are needed. Take, for example, the coke regions in the western part of the state. No portion of the state outside of the large towns and cities is more densely populated, and yet, owing to the fact that the railroad companies so arrange their lines that the coke is loaded upon the cars from the mouth of the ovens, there is no necessity for any greater amount of public roads than there is in more sparsely settled districts. It might be well to make the amount expended by the respective districts or townships a partial basis for distribution, to prevent the possibility of some districts depending entirely upon the state appropriation and doing nothing themselves, but it would certainly be unjust to make this the only matter to be considered. It seems to me that the number of miles of road that is necessary to be kept up ought to be taken into the count. In some of the mountainous sections of the state where there is scarcely any property of any value to be taxed, there are many miles of road that the public good requires should be kept in good condition. In my own county there are several thoroughfares leading into the adjoining counties over which there is a great deal of travel that passes over unseated mountain lands from which very little local tax, if any, is received, and to say that such roads should receive for their improvement no more in proportion to the amount expended upon them by the district to which they belong, would be manifestly unjust.

ISRAEL GARRETSON, of Adams county. The questions of how to have better roads is one that every person who travels, is interested in. Is it not a fact that our public highways are in no better repair than they were forty years ago? The time is here that the public in general demands more improved roads, and in order to do this we must keep abreast with the times. Machinery has been invented to take the place of man power. A road scraper with six horses and eight men is guaranteed to do as much work in one day as eighty men can do with picks and shovels in the same length of time.

Gentlemen, what would you say about the farmer who would discard all modern improvements and use those old-fashioned implements that were in use forty years ago. You would at once say he is behind the age of improvements. It is with the help of the labor-saving machines we are enabled to accomplish more labor and the results will be more systematic. Now, gentlemen, I am favorable to paying road taxes in money, so that it will enable the supervisor to purchase the most improved machinery, and procure efficient labor for our hard money. The time is here that it will not satisfy the wants of the people for us farmers to start out in gangs, old and young, professing to do an honest day's work, simply killing time by leaning on our shovel handles and relating the news of the neighborhood. Gentlemen, this course cannot be abolished to soon for me.

I am favorable to building some of the leading roads in a first-class manner. Depending entirely on the amount of money in the treasury for road purposes. I am bitterly opposed to extravagance, that some of us must have our property mortgaged in order to build extra fine roads to suit the fast-horse men, and wheelmen, to enjoy the salubrious air of the country.

If our city brothers want better roads than we farmers are content to draw the production of our soil over, then I say come join, hand-in-hand, in bearing the burthen of the taxes the agriculturist now bears.

To hire men to macadamize our roads in Adams county would bankrupt our entire county, if such a thing is possible; our county is poor and we must be careful to invest according to our incomes and the amount of available capital.

Col. FRANK MANTOR of Crawford county. Mr. President, I was present this afternoon and embraced the opportunity afforded for speaking on the question of road laws as they actually exist and the power to make them. I said when I rose that I would take some opportunity further on during the meeting to speak in relation to the subject of making roads and repairing them.

Now, I presume to say that every gentleman before me to-night has had just about an equal experience in roadmaking. I presume if you were all called into a class meeting and each one called up by name, your experience would be just about the same. If it is not so it must arise from this fact that either the man must have been born in the woods or else he must have been schooled where they have nothing but good roads. But I think that you must all have had about the same experience.

Now, Mr. President, the little time that I will consume in this matter shall be aimed directly on the question of road building. My friend upon my right here, who is one of the commission to look after this matter, and my friend right over yonder, who has addressed you this evening, will bear testimony to the fact that we would perhaps be about as difficult in building macadamized roads in Crawford or Erie county as our friend from Adams county to arm himself with a six shooter and kill somebody who undertook to make a road. The question of building a MacAdam road in many counties of this commonwealth is all a piece of sheer nonsense. We go to Erie county, about thirty-six miles away from Crawford county, on the one hand, or we go toward Pittsburgh, some sixty-five miles the other way, in order to get the paving stones that lie on our streets. We have no stones, and if you should want to throw one at a bird you would find it difficult to secure one to throw. But we can build good roads, and we have, generally speaking,

first-rate roads. The surface of our county is not rough, like some other counties. For instance, Westmoreland and Mercer are more tillable, I believe, than almost any county in the state, because of the possibility of getting at both sides, but our county is level, and we can ride for miles and find but few hills.

Now, in order to make good roads we have adopted the road machine. A road machine cannot be made to do very good work among rocks and stones, or where large stumps still remain upon the sides of the highway, but where those places are clear we can take a road machine with two men and four horses, and do a large amount of work, and with the labor of five men I can make more road in a single day than you can by trotting out thirty men under the old system. These gentlemen sitting aside of me who live in my county will bear testimony to this fact.

Now, the question has come up here about putting in these cross-ways. Among the most abominable things are these cross-ways if they get out of repair. Some farmers, if residing near by, would dislike to take a plank to make a repair, but take instead a rail and repair such cross-way. In the State of Ohio, under their road laws, you cannot build the cross-ways that are built on our roads. Their cross-ways are twenty-four feet in length, and are made by taking two planks of twelve feet each. Where they have not stone to make side walls they are using hewn timber, and with those materials they make these cross-ways, and you can pass and repass vehicles at the same time over them. But I venture the assertion that there is not a road in this state that has cross-ways that you have not to hold up to let the other fellow over, and if there has perchance been a heavy rain in the night time you are liable to get upset and your neck broken because of the obstruction, for the water has gone under your sluice way and the plank has gone out. Now, who has not had at sometime an experience of such danger?

A GENTLEMAN. I have never had.

Col. MANTON. If the gentleman lived in my county and understood its advantages he would not, yet I believe, if he has not, and lives in the locality that I have in mind just now he would have had his neck broken fifty times.

But let me say to you that the crossings should be made by counties, and the expense borne by counties. There is a law to-day that stands upon the statute books of this state, and that is relative to taking water off roads and not letting it stand thereon. You have a right under the law to-day to take the water off the roads. You commit no trespass by going on the land of another to do so. Now, I know of large sections of country where the roads are disturbed, and especially at this season of the year, because they are covered with water. If by any chance the road could be drained the difficulty would be remedied and they would always have a good road. The difficulty is that they allow the water to get on the road and remain there.

Again, Mr. President, the system that we have in this state of working out our road-tax is most abominable. Men who work out their taxes take the opportunity to work them out when it is most convenient, as between hay and grain harvest, or just after corn planting, or something of that kind. And of all the abominable, lazy labor performed is that which is done on the public roads. I am in favor of a moneyed tax for road purposes, and the evil will in a measure be remedied. I know this will affect politicians somewhat, because it is the best season of the year for their work, and I will find you men who will take the first occasion to sit down on a rail fence and talk politics by the hour. Last

year I passed a gang of men working upon the road, including one old man who had reached his eightieth year, tottering upon his hoe handle, who said to me, "I cannot do anything in the world, but work out my road-tax!" [Loud laughter.] I went a little further, and found another old man of about the same age working out his road-tax. I could have hired a boy eight or nine years of age who would have done more work than both of them. If our taxpayers were made to pay a moneyed tax for road purposes, we could have three times the work done.

As to the framing of a law, our friends, the commission, having heard so many suggestions, they doubtless now begin to realize that their work is herculean, and the commission must be careful, and very careful, to not "bite" off more than they can chew. The danger to that commission will be, that they may undertake to quote all that has been said in this hall, or all that may be written to them by individuals throughout the commonwealth.

Our roads should be made with the idea of not making them over next year. The townships in my county are six miles square, and but one commissioner in each township will never accomplish the work, though one commissioner might be able to supervise the roads. We are subject to heavy storms. I have known of instances where roads have been thrown out of order by one dash of rain. If one farmer had taken a single barrow of dirt, or a few stones and repaired the place, he would have saved a large amount of money in the end in repairing such road. But "what is everybody's business is nobody's business."

Now, this commission has a work before it; and I trust that they will present something to this commonwealth that will be tangible. I opposed here to-day, and until my better judgment can lead me further to convince me that it is an error, I shall always oppose, the idea of ramming your hand into the treasury of the State of Pennsylvania for the purpose of taking money and applying it to roads. Why do I do this? The experience of Pennsylvania has been against it. I have said it before, and it will not hurt to repeat it here, that the state has been a great loser in loaning her credit on similar enterprises. The state cannot afford, in my judgment, to use its money in that way; it is not a safe plan unless by guarantees under well-regulated laws. Some will say the farmers are taxed enough; but if you will give me to-day the property in this commonwealth, with all receipts for protection under the law, that does not pay one single farthing to protect that property by taxation, I will build every road in this commonwealth, and I will keep them in good repair. I say, then, it should be the object of the legislature at its next session to see, or aim to see, that much of this property which is to-day scott free from taxation should be taken and assessed, and the proceeds or tax applied to the building of our public highways. Then we would be profited by it, and all the people and the farmers who pay large taxes would have little or no tax to pay for the public highways. Having said this much, I thank the gentlemen before me for giving the attention they have.

Mr. ELIAS LEATHERY of York county. I did not think I would say anything on this matter, as there has been so much said in all shapes and forms; but I was a little stirred by our friend from Adams county, who spoke a little while ago. Having been sent as a representative from our township, it seems to me proper to make known the wishes of our farmers in general, and especially for the benefit of this commission. I had a little traveling to do last fall and this winter, and I have seen with my own eyes that a great many of our roads are really in a very bad con-

dition, and therefore I think our farmers are justified in looking after these road laws, and for a different mode of construction.

As some gentlemen have remarked here about getting water out of roads, I would say that I traveled over every road in our township, and I positively saw roads with not only gutters at the sides, but a gutter in the middle. As long as these roads remain in that condition, our farmers will have reason to look for better roads.

The width of roads has also been made mention of. We have roads, as some speaker said here a while ago, almost fenced shut. While in this way it is impossible for a supervisor to make a good road.

The matter of rubbish has also been brought up. I live in what I call a very stony piece of country. We have farmers who not only violate the laws that we have there, by taking brush and throwing it over the fence to obstruct the gutter, but they often go so far as to heap those gutters full of stone. This necessarily turns the water right into the road, and it is impossible therefore to have as good roads as they should be. I hope that our commission will not forget these things in their consideration of the course by which we may have better roads.

Now, in regard to our township supervisors, it is the desire of the farmers in our neighborhood that we should have them; and, if the commission sees proper, to spend as little money as possible for local engineers, as our farmers generally term them "Men with high silk hats on." Spend as little for those men as possible, because, after the expenditures are made, the gain may not be so great in that direction after all. Our people are inclined to think that the money ought to be applied for direct work on the roads, and we expect more effective work than we have had in the past.

The farmers in our neighborhood admit that we should have better roads by all means; but they respectfully ask the commission to treat them as farmers, and consider their side of the case as well as the pleadings of our capitalists, in order that our money may be applied in actual work, and not be wasted for officers and overseers. We have an idea that the commission, from the different statements they have heard, will be able possibly to select a better plan of road laws and construction than we farmers are really able to dictate to them. So we have a desire to leave it in their hands, hoping that we will have a road law that will give us better roads and better satisfaction all around.

As far as the state appropriation is concerned, I do not see why it would be a greater wrong to appropriate a portion to our roads than to our schools, provided a plan is devised to properly distribute it. We do not hear any complaints to our townships, or our county, so far as I am acquainted, that we get too much state appropriation for school purposes. I do not suppose, if it could be distributed in the same satisfactory manner, that we would hear much complaint, if we were to get better roads thereby.

There is one thing that strikes me. I do not for my part see a really good plan for distributing it. But I have been inclined to think that the commission could strike some plan, in case they can appropriate money, so that it shall be applied to those places where the roads are the worst, and to a really poor class of people, where the money is needed in order to construct good roads; that there I think, if any place, they should aid, and as soon as possible.

SAMUEL MCREARY of Lawrence county. As our county is in perhaps a different shape from any county in the state: I would like to call the attention of the commission to the situation. Our county was made up

of two different counties, Mercer on the north and Beaver on the south. There were five townships taken from each county, and they make Lawrence county. The northern part is under the Mercer county road laws, the "path-master" system, as they call it, and the southern part is under the old supervisor law. We tried to run a part of the southern portion of the county under the path-master system, but there was a lot of fellows who got on to it, and said "You were not elected according to law, and we will not pay our tax." And there was one time when for two years a lot of them did not pay their tax, and we could not make them. Another thing is, the county was under the expense of laying out and grading new roads. Under the path-master system, the property owners had to pay for it. But we cannot get any redress, and we would like to have it remedied.

N. SEANOR, Armstrong county. I have been listening to the arguments on the making of roads, and the passage of road laws, and have been much interested. As there have been few speakers from the western part of the state, I thought I would say nothing, and listen to older heads, but I have finally thought I should say something.

I do not suppose there is any one present who has traveled over more roads than I have. It is my business to travel from early morning until late at night. Consequently I know the facts about our roads, and have known something about them for the last fifteen or twenty years. We feel satisfied that the time has been reached that there should be some new method adopted by an amendment of the old laws, or the making of new. The people want it; the roads require it. By listening to the discussions, I find that in the eastern part of the state they wish to pike their roads, or fix them up in a different shape from that which we can do in the western part, particularly such counties as Mercer, Crawford and Lawrence. I have traveled over those counties myself, and I must say that they have about as good roads out through Mercer, and through all the north western counties, as they have in many other parts of the state, although there are rough parts in the road. I travel them usually when they are dry.

The trouble is just here, whether the people will be satisfied with the change from the working out of this road tax to a money tax. I do not feel that every person will agree to that, although it has been my position for more than ten years. I thought it would come to that, and I thought that was the only way to have successful roads. Then, of course, they will have to devise some means, such as having a supervisor, or commissioners, and then the supervisor in each township to pay the money to them. But I tell you that the people whom we represent here are the farmers, and they are heavily taxed to-day, almost more than they can bear. They have been in the habit of working out this tax at their leisure, and to turn it into a money tax, it will come harder on the farmer. I have no doubt about this, because men have wanted to sell me something that was not marketable, giving as a reason "I am compelled to pay my tax." They have a hard time to make both ends meet in a part of the western counties, and they are getting further behind every year. Those mortgages are becoming more difficult to manage on their farms. Some are successful, but they are exceptional. The others are losing ground. Hence, if they are required to pay this tax, instead of working it out, it will be hard all through, because these people have interest to pay on their indebtedness, and all this tax that is laid upon them is doing its work for the farmer, and their outgo is more than they can make, and they are going back every year.

Now, I think some means should be provided by the state. If they make that tax a money tax, instead of a working tax, then I think the money tax will do for them more than the old way. But I think the state should aid them for several years at least, and I think it will meet the approbation of almost every one. Unless the state does this, I do not believe there will be a benefit.

Mr. ROAT of Warren. I think the state will aid these men: and they will have the privilege of aiding themselves by having better roads, thereby increasing the value of their land very materially. I think one or two dollars of the tax expended on the roads in the way I hope it will be, will add five dollars per acre in a very few years to the value of every man's farm, if the money is expended in the manner that has been explained. I am decidedly in favor of the paying of this tax in money that we have been working out by day's labor; for where one dollar was expended in the way of taxes worked out, we really got but fifty cents' worth on the road.

I would like, while I am up, to just refer to my own county, and allude to what the Governor and the Legislature, or some other persons will have to do there. I am residing about one mile and a half from our county seat. One-half mile beyond me, or two miles from the county seat, is the hospital for the insane. I am ashamed to say that the road is almost impassable from our county seat to that hospital, such a road as I should be ashamed to take my friends from this vicinity over, should they visit me. I do not belong to the church any more, but my wife does. I have not hitched up for two months and a half, or three months, for the purpose of driving to church, the roads have been in such a bad condition.

We want an educational influence exerted in our county, and if the Governor will appoint a commission, or some lecturers, to show the farmers that there is some movement of this kind to be made, it would result beneficially, and I believe the farmers will then cheerfully pay this tax in money. As I heard remarked at our farmers' institute the other day, they can put men to work out their road tax who are not able to make more than fifteen cents a day. They are able to throw the stone up out of the way. After they get through with my county, I would suggest that they go to the county of my friend from Adams (Mr. Garretson), and see if they cannot work a change down there.

Mr. F. M. McKEEHAN of Perry county. I wish to make a few remarks on the selection of supervisors, viz: that they should consist of freeholders. Now, Mr. President, I think we are all pretty conversant with the fact that we have comparatively few men with that amount of energy which will enable them to take hold of this business, who have not more or less responsibility resting upon them, when you come to examine the dockets. If you are going to confine your supervisors to those who are freeholders, you may get a very inefficient board of supervisors to take charge of this matter and the money. It reminds me of the remark made by a person a few years ago, that no person should sign a petition for a public road except a freeholder. The mortgages and other evidences of indebtedness against that man will show that he is not really a freeholder to-day. I do not think that would be wise, that a supervisor should have real estate. I do think you should incorporate that into the law, that the man should be a freeholder.

I hope, if the state is to aid, as I hope it will, or if the state is to protect the corporations and store keepers, and they are all protected by the same means of protection, then I think that the state ought to

aid, and that that aid ought to come in the shape possibly of our school appropriations, or, in other words, that you should make it in proportion to what the respective townships pay toward keeping up our roads. In some counties they pay two or three per cent. total tax. Take our friend Wilson's place in Juniata, some townships pay twenty-nine mills; we are not paying very much less, and I think we will pay a little more next year, over thirty mills probably in Perry county. We have been swept badly, and we will feel it for years to come. But let me say, on the other hand, that every county is benefited by good roads, and that a man had better pay twice the usual amount of tax than drag out the existence of his animals on the public roads. In other words, if they had a good system of roads, the farmers would be benefited \$160,000,000 in the value of teams, and save \$50,000,000 annually in hauling, which would be a good interest. As it is, during the season of bad roads I will not take out my team to drive to Newport, unless absolutely necessary, to wear the life out of my animals. I had better pay twice as much tax, in order to be able to go comfortably at any time, and I would be making more money in the end.

Mr. HENRY of Clarion county. I have been listening and learning, and I think I have gained some advantages. I am from the western part of this state, two hundred and fifty miles from here, in Clarion county. The roads there have been tried and found wanting. We have had no returns for our money, and it has been thrown away. In our township of Porter we pay yearly about ten mill of working tax, and from two to three mills usually of cash tax. That cash tax is used for the purpose of buying plank and building bridges by the supervisors. Last year by the floods in that township we lost all our bridges, and we had to borrow considerable money. It will take next year some four or five mills to put us back where we were. How can we remedy this? I see no other way than by levying a cash tax. Our farmers want to do the work, and they send boys and old men tottering on the grave. The result is they get full credit in the evening and nothing done. That is the reason we have so many bad roads. Another reason, they elect somebody that they want to keep off the township. We had better put him in the poorhouse. There is a certain element that does not want to work, and if you put up a candidate who wants good work done, they will not elect him. They want a lazy man like themselves, and they do not want to have any work done.

Now there is the money tax. We must have some men to work, and we must pay them and the supervisor or overseer that will work, and whenever we get that done, we will have good roads made. Let the boys stay at home, and let the men who have the bodily strength to work come and do it, but no man or boy that cannot work out to be put to work and given credit. The poor worker should not get credit.

In our county I can hardly haul enough coal to keep us from freezing. This is a fact. I hope when we get home the ground will be frozen so hard that I can haul some. I hope that this commission will draw up a good bill, and that it will be enacted into a law that we can enforce. But the law we have is set aside, because we have not the back bone to enforce it. [Applause.]

A. FRAZIER of Venango county. I do not wish to add anything to what has been said, only to say for Venango county that we hope this commission will recommend a bill to the Legislature that will provide for and enforce the payment of this road tax in money. Yet we will

not pretend to say what it should be. We think it is in safe hands, and believe that they will give it their closest attention.

We have very bad roads in Venango county. We know that they could not be made much worse, but we are sure that they can be made much better. We have not a complaint to make of our neighbors of the adjoining county. We have plenty of complaints, but rather than have any difficulty we would gladly continue the Crawford county system, with the exception that they be required to fix their roads. [Laughter and applause.]

Mr. CHANDLEE EVES of Columbia county. It is getting very late, and I presume this Board desires to adjourn. But at a farmers' institute at Benton, on the 9th of this month, a committee of seven representative men of that district was appointed to take into consideration and report at a future stage of the meeting—they had two sessions, I think, of the committee—their desire was to recommend something like a little step of progress, and not anything that was wild, and that could not receive the sanction and good judgment of good men. They agreed, first, that the tax should be paid in money—not worked out; secondly, that there should be a board of supervisors, three in number, one elected each year, serving for three years; thirdly, that the construction or repairing of the roads should be by contract; the repairs in convenient sections, and for a term not exceeding three years. Fourthly, that where there was a dispute between the board and the contractors, it should be decided by the township auditors, and that decision final. Fifthly, that twenty per cent. of all moneys collected for road purposes should be used in making permanent improvements. I leave the question beyond that, without making any recommendation upon it.

Mr. PRATT of Montgomery county. There is one point that I wish to refer to, and it is this: I apprehend that this commission is not going to bring about a revolution. I apprehend that the outcome of this thing will be a good deal like it is at present—that the law will be such as to enable people who desire to improve their road, to have a road or the privileges to have it; and where they do not want to have it, they will not be paid—there will be no compulsion about it. My friend Garretson can make roads down in Adams county, or let them alone, but if he does not, he cannot get his appropriation, and it may be that those people will soon be convinced of their duty. I remember that in the township of Limerick, Montgomery county, there was a law that unless they have six months' school they would get no appropriation. Something similar might be applied to appropriations for road purposes.

But because of no stone in Crawford county to make a macadamized road, would any commission or set of men, ask them to make macadamized road? Perfect nonsense. And if they cannot construct a macadamized road in that county, are they to say that we cannot do so in Montgomery, if the line is constructed so that they can do so? It will be absurd to oppose it. I apprehend that the law will provide such roads as the circumstances will allow. If they have to use sand, certainly, they cannot do any better. They could not be presumed to go into another county to hunt for stones, or go miles away for them; but where they propose to take advantage of the facilities, let them do so, and get an appropriation. I do not say where they have no material to have a macadamized road, that they shall not have an appropriation if they improve their roads with the material they have.

Secretary EDGE. In order to be efficient, such a law would have to define specifically what was meant by "permanent" improvements, they

need not necessarily be McAdam roads; there are other kinds of permanent improvements worthy of attention. And just here is where the county supervision would come into play; the law having defined what constitutes a "permanent" improvement, the county officer can decide whether the improvements for which state funds are claimed are "permanent," and if so, I think that much of the difficulty anticipated by the gentleman will have vanished.

How would it do for the law to provide that up to a certain limited amount, the township should receive from the state dollar for dollar the amount actually expended for permanent improvements from the township levy?

Mr. PRATT. That would not do either, for they have no material with which to make permanent improvements, it would be arbitrary. Where the people of a county like Lawrence do the best they can, it is manifestly right to receive an appropriation, and as much as though they were located in the heart of a limestone country. To propose otherwise would, I think, be a position not well taken. The state in some way will have an inspector. They will find out in some way whether these roads are to have a permanent improvement; and, if so, they get the appropriation, provided they take the best material they have at hand—that is my view of it—and, therefore, we must all try to be as liberal as we can. We must not say that because we can do so and so, that the people in another county cannot do the best they can. If they can get first-class roads, let them have them. If we cannot have a first-class earth road, do the best we can; and others the best they can. That is the conclusion, I think. If we want to set ourselves against a law before it is made, we will never get an improvement that way.

As to the state appropriation, I think that is very clear, as we are all taxpayers. We contribute to the funds of the state treasury, why shall we not have some of that money for road improvements? I cannot see ground for any objection to anything of that sort. I think we are all pretty well convinced of the propriety of having all road taxes paid in cash. I heard a farmer say to-day that he was perfectly satisfied to have that matter changed; he could use the teams at the mill, or at his farm, and earn more money than on the road. I think that proposition is correct. Boys that can hardly handle a shovel go upon the road and fool around the horses, and sit upon the banks of the road, and receive credit for the wages, whatever they are, and in that way we have had very bad roads on account of inefficient labor. I have known boys to throw stones as big as your head out into the middle of the road, and leave them lie there, too; and that is just the kind of work that has been done by them. If that part is repealed and left out of the new law I think it will be much better. If we put our heads together and let this commission work together, without confusing or embarrassing them, we will come to a reasonable and satisfactory conclusion.

Mr. PHELPS. It appears to me that we ought to arrive at some conclusions, and, therefore, I call for the reading of the resolution, or pointers, that Mr. Cooper presented before our adjournment this afternoon.

CALVIN COOPER of Lancaster. They are as follows: 1. The repeal of the privilege of working out the road tax. 2. Requiring the supervisors to employ the necessary labor where they can get the best labor for the money expended, giving the preference to the resident laborers. 3. Requiring other commodities or properties of equal value with real estate to pay their proportion of the expenses. 4. Some efficient head in each county to supervise and prepare plans and specifications.

In order to bring the matter before the Board, I move that the pointers be adopted as the sentiment of this Board.

Mr. PHELPS. I second the motion.

A GENTLEMAN. I move to strike out the section that refers to the employment of the engineer or the supervisor of the work, who is to furnish the specifications, who is to be a county officer.

Mr. COOPER. The gentleman possibly misunderstands. The fourth is that some efficient head be had in each county to supervise and prepare plans and specifications. It says nothing about an engineer—some head person—some person who is qualified to draft out plans and specifications. There are such men who are not engineers, who can be employed cheaply.

Hon. WM. EVANS of Chester county. I cannot see the expediency of passing that resolution requiring some county officer to superintend the ordinary working on a township road. Now, I assume that the action of this commission will not presume to change the relation of the courts to the building of county bridges, and all expenditures exceeding \$100 for bridges. As that now belongs to the township authorities, I would think it would hardly be necessary to have a scientific engineer to make any specifications to build a township culvert, such as is now built by the supervisor. If this commission proposes to change the relation of the district courts to the county work as it now exists in building large county bridges, why then that resolution would cover that point; but I presume the members of this commission will not attempt to embrace that feature in the present road law, because I do not think it can be improved on in any way. That is a county work, and is paid for out of the county treasury. The work that is before this commission is, as I understand it, on the special work relating to the collecting and assessing, and expenditure of the tax collected from the local districts, and the expenditure of that money in the most judicious and economical way.

Now, I would like to know from my friend, Mr. Cooper, or anybody else that is familiar with what the contemplated change is, whether it embraces the county expenditures only, or the township ordinary expenditures?

Secretary EDGE. I notice that Hon. A. D. Sloan, who represents Indiana county in our State Senate, and who is a member of the road commission, is present; will he give the meeting an account of the proposed work of the commission as contemplated by the resolution offered in the House of Representatives by Hon. J. G. Foight, and upon which the work of the commission is founded?

Hon. A. D. SLOAN. In the language of the resolution under which this commission was appointed, they are directed to arrange and codify the laws, if I remember it correctly; to revise and consolidate the road laws of the Commonwealth, and to pass upon the question of the advisability of State aid. That is about the sum and substance of it. Mr. Foight, also a member of the commission, is the author of the resolution. That has been a question that we have been talking over, but we are not far enough along yet to state conclusions. It is utterly impossible to arrive at any conclusion until there has been considerable time spent and a good deal of labor. I have heard the question of State aid talked of here to-day, and it occurred to me that State aid could be given in precisely the same manner that it is given to our common schools. They give it to the common, school districts in accordance with the number of pupils enrolled. Why not give it to the townships in accordance with the number of miles of road in the district? It

seems to me that could be regulated without very much trouble. I have not been able to be here, so as to hear all the discussions, but on that branch it seems to me there ought to be no difficulty, so far as that is concerned.

As to the other matter, there are innumerable special laws, nearly all based upon the act of 1836. Our present task is to hunt up all the laws and ascertain what they are and make a report, and if possible frame a bill that will meet the wants of the people. This discussion to-day by the State Board has been of very material benefit to the members of the commission.

Mr. BOYER. It seems to me that one of the most important things that this Board can do is to take some action to the effect that the farmer and others need State aid for road purposes, and that the extending of this State aid has been neglected. I think you should embody in the action of this State Board something to the effect "that we demand that this commission, or the new law, provide for some State aid." If an appropriation were made, I think it could be equally divided among the districts in a manner somewhat similar to the distribution for school purposes.

A GENTLEMAN. One of the duties of the commission is to prepare a bill to repeal all old laws that have any reference to roads in this State, for we are as much at sea with the road laws as we are with the fence law. We have a fence law, and no person knows what it is. I do not know that we should care so much about it, if we had the subject cleared up. If we knew we had no law, we would be better off. If the Legislature were to enact a new law, and leave all the other laws in existence, we would be about in the same condition as under the fence law.

Secretary EDGE. I would call the attention of those present to the fact that the session of this evening is not, properly speaking, a regular session; that is to say, it does not appear upon our printed programme as such; during the session of this afternoon it was decided to hold an evening session; some of the members of the Board were compelled to leave at the close of the afternoon session, and I promised them that no important vote would be taken during the evening; I do not know that there is a single member of our Board opposed to the extension of state aid; in fact I think that I may say that all are in favor of it; but in compliance with my promise, I should oppose the taking of a decisive vote upon any important question, for the reasons stated above.

Mr. PRATT, of Montgomery county. My recollection is, that we adopted these pointers this afternoon; but whether they were or not, it seems to me that we ought not to be too hasty. There can be no action of the Legislature until next winter. When this Board meets again, there are two or three points which we can take up and act upon more intelligently. Yet it seems to me that in regard to having some head, any action is unnecessary—the roads are laid out—we are simply going to improve the roads as we have them. If these roads were to be new roads, it would be very important to have an engineer. But it is a question whether we ought to have a head. As to so many roads being in a district or township or county, I will only say that they have been multiplied because they have been bad, and shorter roads have been laid out. It may be that when we get a few good roads the others will be abandoned.

E. REEDER, of Bucks county. I think I remember what took place this afternoon. Before we adjourned a gentleman gave a few pointers. He felt that they were so drawn that we could approve them. Then he proceeded to read them, but there was no vote taken.

A GENTLEMAN. That is correct.

Mr. F. M. McKEEHAN. I think there is no desire to have this vote.

Mr. PRATT. I move that action upon these pointers be deferred until the next meeting.

The motion was seconded and agreed to.

Hon. J. G. FOIGHT. I think it is the opinion of the commission, and it was their object in being present here to-day to get the sense of the members of this State Board on this question. I feel satisfied that they would be very glad to have any action taken. As to taking action now, or when the meeting is full, it is for you to decide; but I know the commission would be glad to have you take action as a body, that they may know what the sense of the Board is in regard to this question.

Mr. PRATT. My impression is that the members of this Board did not take as active a part in the discussion as they otherwise would, on account of a desire to give way to strangers. Therefore, the Board have not acted on the subject as they otherwise would likely have done. I make this motion, that at the next meeting of the Board, action be taken. It will likely be as full as it was here to-day.

Mr. FOIGHT. I felt disposed, and I believe a majority of the commission felt that way, that it would have been considered impertinence on our part if we had suggested hearing from members of this Board in preference to strangers. But it was the object of the commission to hear from the Board fully and freely.

Mr. WITMER. I was sent here as a delegate to represent the county of Lancaster. I think it is hardly fair for gentlemen to come here as delegates and participate in the discussion and have no right to express ourselves when final action is taken. Neither do I think this Board should adjourn without taking definite action on the subject before the Board to-day.

Mr. PHELPS. As I seconded the motion, I would say that I do not see a want of propriety in the adoption of these important pointers. These gentlemen who went away knew there was to be a meeting to-night, and action taken likely. They have gone home, or are now on their way and probably in their sleeping berths. It seems to me, as members of the commission have asked for an expression, that we ought to take some action, if it does not conflict with some resolution in regard to this question. I do not suppose that the resolution will change the matter at all—it will be only a straw to show what the mind of the general public is in regard to some important points. They have given their ideas, and probably their minds are fixed already in regard to the matter. These resolutions are not law by any means; they are simply an expression of sentiment. I do not see how our votes are going to conflict with the sentiments of any other member who is not here this evening. There is nothing to conflict with immediate action, and I would like to see the motion put.

Mr. CRITCHFIELD. I am not sure whether my motion to strike out the provision for a county supervisor was seconded or not.

A GENTLEMAN. I second that.

Mr. EVES. I think we should take these up separately.

Mr. COOPER. Then I offer a motion that the pointers be adopted as read—first the repeal of the privilege of working out the road tax.

Mr. EVES. I second the adoption of that.

The VICE PRESIDENT. Shall this be a vote by the members of the Board, or a vote by the members of the Board and the delegates?

It was moved, seconded and agreed to that a vote of the Board be

taken first; whereupon the Board unanimously adopted the proposition. A vote was then taken, all delegates present voting, and the proposition was unanimously agreed to.

Mr. COOPER. The second pointer is to require the supervisors to employ the necessary labor where they can get best value for the money expended, giving preference to local laborers.

This proposition was unanimously agreed to by the Board, and unanimously agree to by the delegates.

Mr. COOPER. The third pointer is—requiring other commodities or properties of equal value with real estate to pay their proportion of the expenses.

Secretary EDGE. Cannot the words "of equal value" be stricken out without damage?

Mr. COOPER. I think not. "Of equal value with real estate," because it is taxed at its full value; and my idea was to get at it so as to put it on an equal value with real estate.

The proposition was unanimously agreed to by the Board, and also unanimously agreed to by the delegates.

Mr. COOPER. I want you to distinctly remember that in this next pointer I make no allusion whatever to "engineer." I think it is important, because we can get some other efficient head to draw up plans and specifications without employing these expensive engineers as has been referred to. The pointer is, that some efficient head in each county be employed to supervise and prepare plans and specifications.

Mr. PRATT moved the adoption of the proposition, and the motion was duly seconded.

Mr. BROSIUS. I do not think we want any county officer in this matter. We have been getting along very nicely so far; and we want this without the interference of any authority, except our own—to have the liberty to do what is wanted within ourselves, and not have a county officer to interfere with our township management.

Mr. EVES. Rather than we should take a vote and disagree materially on this, I think we had better table it.

Secretary EDGE. Meet the matter squarely, as we have met the others.

Mr. EVANS. I think it is a very bad feature, and will defeat the whole business if it is incorporated in any law and submitted to the people for their adoption; for if there is anything that people detest in agriculture districts, it is this supervision of work at their expense and they having no jurisdiction over it. I object to putting any man in a position where he has no possible interest in the local improvements of the particular neighborhood. I think there is nobody as well suited to know what his particular district needs as the citizen at home, and there are plenty of people at home qualified to make the necessary improvements on our ordinary country roads.

Mr. COOPER. I think this matter will regulate itself, or that the commissioners in their wisdom will be able to prepare for it.

DAVID WILSON. Will not the supervisors answer?

Mr. COOPER. I think not. We have never yet had a supervisor in our district that had anything like the best ideas of laying out good roads. Each man has his own plan, and no system to regulate it, and no way by which he could be governed. In order to get at that, I think we should have some efficient plans prepared.

Mr. PHELPS. In regard to that question, I would like to have a head somewhere. People pay money tax, and they want to know where that money tax is going. The path-masters in our county—and there are four

in our township—go ahead until we have twenty different kinds of roads within our boundaries. Now, we want a certain system whereby a good practical man with a level head can go to work and construct a road properly, so that, if necessary, if a piece of road is sublet in sections, as on a railroad, we will have one system running from one end of a township to the other. In our township, as it is now, one path-master will say "let us have a narrow road, not over twelve or fifteen feet wide to the ditches;" whereas the path-master at work in his immediate vicinity may have a part of that road made still wider.

The PRESIDENT. Is the path-master under the supervisor?

Mr. PHELPS. Yes, sir. We have four supervisors in our township; they are elected by the people in February, at the town election, two being elected each for two years. They meet on the second Monday in April, according to law, and they make a levy on the valuation of property for the tax that they will require. Then they appoint a supervisor on the sub-districts. We called them "beats," if you please. They go and pay a man to oversee that road. Now the supervisors never go near that road at all, and I think that is the general thing all over our county. The path-master sees that the road is worked out according to the warrant that has been handed to him, placing in that warrant the duplicate of each man's tax to be worked out. That ends the business right there; the path-master goes on the road and calls them out, and they sit in the fence corners and tell stories.

The PRESIDENT. A sort of sub-supervisor.

Mr. PHELPS. Yes, sir. What I want is to remedy this matter, so that we may not have twenty different roads in our township, and that we may have the best men in the township to fill the position. I want a head to it; I don't care where, so it is an efficient head.

Mr. CRITCHFIELD. I am just as much in favor of having a head to this business as any one; but why cannot we have a head in the township as well as have a county officer? There is nothing of which the rural people, at least farmers, have more dread than a multiplying of public officers. I think we have men just as efficient in the township as in the county.

The PRESIDENT. The paper does not say they shall not be of the township.

Mr. EVES. We cannot agree on this unanimously. I move that further consideration of it be postponed until the next meeting.

The motion was seconded, and not agreed to.

The PRESIDENT. Shall there be a roll call of the members?

Mr. PHELPS. I am not particular as to that.

The PRESIDENT. If there is no objection, the secretary will call the roll and record the vote.

Mr. COOPER. The fourth pointer is, that some efficient head in each county be employed to supervise and prepare specifications and plans.

Mr. PRATT. I move to strike out "county" and substitute "township."

The motion was seconded, but after some discussion was withdrawn.

The PRESIDENT. The vote stands yeas six and nays nine. The proposition is therefore lost.

At 10.50 o'clock, P. M. the Board adjourned.

OPINIONS OF PRACTICAL MEN UPON THE ROAD QUESTION.

In order to obtain the opinions of practical farmers and others interested in the various divisions of the road question as considered at the annual meeting of the Board, a circular letter was sent to a number of the correspondents of the Board, and to others who were supposed to be in a position to give practical answers, asking an expression of opinion upon the following points:

1. The payment of road taxes in money instead of in work.
2. The taxation of all classes of property for road purposes.
3. The extension of state aid for the permanent improvement of our township roads.

The following constitute the leading answers sent us, and they may be taken as an indication of the views of the class to whom the circulars were addressed.

E. J. HOOVER, Lancaster County. In regard to the cost of constructing and maintaining McAdam roads or turnpikes, I have been gathering the experience of a number of our practical men connected with our turnpikes in our county for quite a number of years, and the general estimate is \$5,000 per mile for constructing our turnpikes, and \$200 per mile for maintaining them annually. An estimate made by A. M. Frantz, Esq., who has been associated with quite a number of our turnpikes as manager and solicitor for quite a number of years, it requires 4,266 perches of stone per mile at ninety cents per perch, amounts to \$3,839.40 properly broken and placed on the road—leaving a balance remaining of \$1,160.60 for grading and preparing the road-bed per mile. This depends somewhat on the distance the stone must be hauled, but it is about a fair average. This estimate is made on the turnpike being twenty feet wide—depth of stone fifteen inches center of road, and nine inches outside. This would hold good I think in our county, and it will be seen at once that it would be entirely too expensive for our county roads, used for general purposes; in a county where there is plenty of loose material and near at hand the case would be somewhat different.

As regards the payment of road taxes, I think our people are somewhat divided on this question. Under the present law our supervisors must get their help and team from among the farmers along the public roads and in this way most of the road tax is paid, but under a different law and some other system this might be changed for the better.

Our farmers and the people in general are opposed to county road superintendents, believing it would increase their taxes still more, and might have a tendency of taking road making out of the hands of the tax-payers of the district (where it properly belongs) and place it in the hands of officials at the expense of the tax-payers.

An improvement in our system of road-making has been suggested by some of our practical men (and I think well of it) is this—elect a good practical man (or two if the district is large) give him power to hire a few men for the summer months whose duty it shall be, with the supervisor, to repair and keep the roads of the township in proper condition.

during the year, making that his business; doing just the thing most wanted at the proper time and keeping a watchful care over the roads just as our well managed railroads are looked after.

Our farmers as a general thing, think that all classes of property should be taxed for road purposes. At this time particularly, when the farmer is oppressed with taxation and low prices of his products, he looks for relief in some way, and anything that will help him along better will be gladly accepted.

W. G. BERRY, Washington County. To the first proposition, the payment of taxes in money, we will say emphatically, yes, and because we are convinced that no permanent or lasting improvements either in roads or road laws can be made unless we abolish the plan of working out taxes.

Farmers as a rule have not time, at the most favorable season for road repairs, to leave the farm, nor in this county (Washington) can men be hired to labor on the roads for the wages usually allowed by those in charge of township roads; as a rule, not more than \$1 per diem.

Nor can a man be elected as supervisor who will require of two neighbors and friends an equitable day's labor on the roads.

We must have a man who will devote his time to road making, who will be empowered to employ good hands, and to pay them cash at the close of each week.

The second proposition, that of taxing all classes of property for road purposes, we think must be answered in the affirmative. In this county one single industry, that of oil production, with an average daily production of 10,000 barrels for the month of December 1889, amounts to at \$1.25 per barrel about \$375,000, and for the year ending Jan. 1, 1890, over four million dollars. Then suppose we could tax this product at 2 mills, we would have the neat sum of \$8,000 for the permanent improvement of our highways in this country; and surely they could not reasonably object, because no other single industry does more damage to the county roads, although the production of natural gas is a great injury to the township roads. A majority of our people could favor the taxation of all classes of property, excepting public buildings and charitable institutions, and with the proviso that the money must be expended in the district in which the tax is collected.

And to the third and last enquiry we must give an affirmative answer. Because, we have come to a point when the leading minds of this Commonwealth desires to see some improvement of a permanent character made on our leading roads; and as counties in this State do pay to the State Treasurer a liberal tax on personal property, consisting of bonds, mortgages, &c., many farmers claim we should, in addition to what is received for educational purposes, farmers institutes, as well as bounties to agricultural societies, receive an annual appropriation to aid in permanent improvement of county roads. We have in the western end of the State, as a rule, abundant material to build permanent road ways; the leading questions seems to be by what plan and from what source can we raise the money to carry on this improvement. Allow a word in conclusion and briefly.

First. Our county roads need a more efficient and intelligent supervision, and by not more than one road commissioner in each township.

Second. A more thorough system of drainage either by use of stone or tile, and would advocate the latter as the most permanent and economic. The drains to be built in the most advantageous position, either as cross drains or parallel with the roadway; and often immediately under the road bed.

Third. That all county roads must be kept smooth at reasonable times by use of roller or drag, and all loose stones or other material must be removed for the roadway.

JOHN I. CARTER, Chester county. *First.* An effective law must be general, and in order to suit the varying conditions of the different sections, it must have premissive features as well as mandatory.

Second. Effective labor is skilled labor, and hence is the cheapest to employ; but it has to be paid cash, therefore, the "working out" of road tax by the tax-payers must be absolutely abolished. There are no two sides to this phrase of the question.

Third. The farmer's fear of increased taxation stands seriously in the way of thorough road improvement; therefore the road tax should be levied upon all classes of property alike, thereby increasing the amount of tax received without increasing the levy rate. This is not only in keeping with sound equity, but is in accordance with the explicit requirements of the State Constitution.

Fourth. State aid in some form might be desirable. The building of a State road would be a very difficult thing to make satisfactory. It could not be located so as to make its advantages benefit the whole people or its burdens be equally distributed. Its most plausible use would be to educate the people to know how to make and how to appreciate a good road. Perhaps a better way to give State aid, would be to pay a county road superintendent, or county road commission in each county—said superintendent or commission to be appointed by the county court. The duties of these officers to be largely advisory and educatory. To take such part of the county commissioners present duties as relates to roads and bridges. This superintendent or commission to have as one of their number or to employ, a competent engineer or road expert, that our roads may be intelligently constructed and judiciously managed. We want a general system of road construction and road repair, and such can only come from a general law, enforced by general officers—at least directing the local or township managements. Of course the very best law may fail in effectiveness if the people are not ready for it, but they may grow to it. All law should be a little in advance of the people, and to that extent be educatory; and our law-makers should keep the educatory feature steadily before them, when framing an effective road-law. If any clause could be included that would require or open the way for the people to come together for consultation or direction, the battle for good roads would be half won. We have the means; what we mainly want, is the will and the know how.

JASON SEXTON, Montgomery county. First of all I can conceive of no one plan of road building, or road repairing, that will adapt itself to all conditions, soils and localities of the many counties and towns throughout the State needing good roads. A great deal of discretion must necessarily be left for the tax-payers and those authorized by them to build or repair the roads—for in many sections of the State and in many townships, we have nothing but clay soils to build roads of, or to repair them, with stone or any other good material very hard to get, and in many localities would have to be hauled for miles at great expense—while in other localities there is not only plenty of stone, but good gravel beds, the best and cheapest of all materials for road making, so that, in very many townships there is no reason why, under the present very defective laws, such townships should not have good and

comparatively cheap roads. Yet we know that even in these much favored localities where there is an abundance of good and cheap material, the roads are often found to be in the worst possible condition, so that under our present very defective system of road making and repairing, even though we have in many townships the best of material, and of the cheapest, it does not follow that such townships have good roads. For while our present road laws have served their purposes well, in the years that have gone, and have given as many fairly good roads, yet all thinking and progressive men must now acknowledge that these laws have outlived their usefulness, and must be repealed, if we hope to advance in the line of giving to ourselves and our posterity the priceless boon of good roads. The thrift and prosperity of any agricultural community the world over, is read in the good taste and beauty of their homes—in their well equipped buildings and surroundings, their well fenced farms and well cared for stock, and I had almost said, the fine condition of their public roads, (but how often have we been obliged to apologize for their deplorable condition, and place all the blame upon our servants, the supervisors.)

Yet as farmers, we are not all together to blame for the bad condition of our country roads (as our city cousins would have us believe,) we, like other men, have had other great interests, and responsibilities to meet all along the line, and from the days of the dumping of the tea into the briny deep until the present, the yeomanry of this great republic have borne their full share of all the responsibilities and duties belonging to the loyal citizen, and have helped to give this nation not only the highest civilization, but the best government upon which the sun has ever shown. And now let us turn our attention to the needs of the hour and help on the agitation of this road question, and help educate our people up to this much needed reform. For our people never fail when the light is turned on, and their duty made plain.

Now this brings me to the answer of your first question namely—the payment of road taxes in money instead of work. From past experience, I would say always in money, instead of work, and should never be allowed to pay in work—as under the present system the supervisor can accomplish very little by giving work to a lot of tax-payers, who expect to do a half day's work at home, and then be allowed a full day on the road, and not half work at that, except it be on a piece of road adjoining his own property, so that under the present system the supervisor's hands are almost completely tied, for with the tax-payers to deal with, and dictate to him, he is completely in their hands and feels and knows that if he honestly does his duty to his township and the roads, he will be very likely to lose his head at the next election, and some one more pliable be elected to take his place, so he shrinks from duty and does not accomplish one half for the good of the roads and township that he otherwise might, had all the money been placed in his hands due, and he been left free to hire such help as would have been most suitable for the work to be done. If the present system is to be continued, not only should that part of the road laws be repealed, but they should be so repealed as to fix the term of the supervisor at not less than three years, instead of one, as now, for no supervisor can do justice to the roads or his township, when he is obliged to feel that his term is but for one year, and his successor may undo the next year what he had planned and commenced as a real improvement to the roads of his district. So with the present law repealed, requiring all road taxes to be paid in money and making the supervisors term not less

than three years, I think I see how much more might be done to improve our roads than at present.

Then I would suggest that not only should every township or road district own its road scraper, plow, roller and what other tools may be needed, but should own its steam stone crusher, as well to be located as near the centre of the district as possible, at some good stone quarry, where stone could be cheaply had and crushed for the repairs or building of the roads. These machines should be run at a given price per perch, winter and summer, preparing the material for the repairs of the roads, which could again be hauled by the perch to the points or places most needed under the direction of the supervisor.

In most townships there are more or less quarries always open near or at the roads, whose owners would be only too glad to lease them to the districts or townships, and at a nominal sum. In other townships, quarries might easily be opened in some good locality, and at convenient points on the line of some roads, where stone could be cheaply had for the crusher, and when too far to haul from a given point or locality. The machinery could be easily moved to another locality, nearer to where the stone may be needed, so that after a few years of this steady constant work, the roads would not only be greatly improved, but many miles would be permanently macadamized, and as each township and county did its duty in this line, constantly using new and improved methods as we advise, I fancy not many years hence our fondest hopes of having fine roads will begin to be realized, and future generations will rise up and call us blessed. And now for the question of taxing all kinds of property for road purposes. I am aware that the first cost of good roads is so great that no ordinary agricultural township or district, could or can bear the burden in a single year, or in five or ten years, of placing their roads in the condition they should be, without greatly increasing the burden of the already over-taxed farmer, and in the present depressed condition of agriculture, I would not recommend any measure that would add directly or indirectly to the burdens of this struggling class of our people, who for years have been taxed far beyond any other class of our citizens, and often far beyond their ability to pay. But the question arises, can there not be some plan devised by which a revenue, small though it may be, can be placed in the hands of our town authorities, to be used as best it can to put our roads in the best possible condition, and to make all repairs as permanent as possible.

Why not give to the townships all the revenues collected from hotel licenses and all other licenses, for road purposes, after the expenses of collection has been paid? Why not enforce the dog law and give us all the money from that source? And then be careful to tax all property for road purposes, that is taxed for any other purpose. For the benefit derived by property lying in the localities of good roads is shared equally by all, and all should help bear the burdens, if it be such.

The extension of State aid for the permanent improvement of township roads, is a question needing careful thought and study, and one which our legislators will soon have to meet and solve, but if in the near future a just and equitable law could be framed giving directly to the townships for road purposes, a sum of money, the equal of which must be raised by the township to be applied for the same purposes, in addition to its regular road tax, a stimulus might thus be given the township to do much more for their roads than they otherwise would do in order to secure and use the State's money. No doubt a law of this kind

would be productive of much good, and result in much permanent improvement to the public roads of the State. But any law, looking toward the creation of a long list of salaried office holders, in whose hands vast sums of the people's money would melt away, long before it came near them like snow in an April shower, would be looked upon with distrust, and would defeat the very end for which it was created. So that whatever may be done in the line of State aid, to improve our public roads, should not only be done with great care, but a line that will win the entire confidence of the people who pay the taxes.

The aim of all should be to reduce taxation and not increase it; if possible, to avoid it.

In regard to State aid, the people are not fully prepared, I think, to give a decided expression on this subject. If such a law was passed it is a question in my mind whether, on the whole, we would be benefited. May it not be quite as well to let each township in the State pay its own road taxes? I think the people of the township in which they live should pay for their road-making themselves, and not depend on State aid. I am quite sure that in the end road making will cost less over the State, and in this way is not so likely that public monies will be so easily misapplied, as is often the case when appropriations are made for public use.

JOHN J. MOORE, Bucks county. Let a board of five or six supervisors have charge of each township with power and authority to call upon the taxpayers of each sub-district to work upon the roads themselves, or furnish a substitute at any time they shall be called upon. The remuneration, therefore, to be deducted from their taxes.

In favor of taxation of all kinds of property.

No, it cannot be satisfactorily applied throughout the State, and what is permanent improvement? We have nineteen and three-fourths miles of stoned turnpike roads leading out of our borough under the care of five different boards of managers. The cost of repairs for material and labor alone for the year 1888, was \$154.30 per mile, and that was about the average cost per mile each year.

Only such future legislation as will substitute a board of managers, elected by each township, with power to divide it into sub-districts, they acting as a unit in the general supervision, but individually in regard to keeping his own sub-district in repair.

F. M. McKEEHAN, Perry county. 1. The payment of road tax in money instead of work. We answer unhesitatingly in money. If the half of the taxes levied were paid in money and expended with any degree of scientific or practical knowledge, as to the construction and repair of our roads, they would be passably good the year round.

When paid in work, comparatively few do an honest day's work. Those who would, are interfered with by others in conversations, etc.

For many persons go to pay taxes, and the numbers often are too large for one man to oversee; too much time is lost in the great distance that supervisors skim over the roads. Too many feel no interest in the repairs, except upon the roads they are necessitated to use; hence in many places little things of great importance are treated with great indifference, never thinking that large leaks announce themselves, but the result is just the same by small ones. If taxes were paid in money, we would all want to see an equivalent; hence a greater watchfulness as to the proper expenditure. The first important thing is proper drainage. No water should be permitted to stand along the roadside, but carried away at the first opportunity. No canal on either side to endanger life

or limb. It should be lawful for the supervisor to employ persons by the year on certain portions of the road to keep open side and cross (or breakers) drains after the road has been put in repair. More intelligent supervisors will give us better roads; and if the working system is abolished, the inducement will be destroyed for the masses to vote for the man who will make an easy supervisor, and thus intelligence, worth and responsibility will be sought; and that can be had by electing only one man at one dollar and seventy-five cents per day, and not two dollars and fifty cents or three dollars as contended for by some.

2. The taxation of all classes of property for road purposes. We answer by asking why not? Is real estate the only species of property that is benefited by public thoroughfares? Is not the value of all personal property benefited? Are not all associations for profit, incorporations, dealers, professions, etc., interested? If so, why should they not bear a part of the expense? Gov. Abbett, of New Jersey, in his inaugural called attention to the great railway and canal corporations worth \$70,000,000 escaping local taxation. How many millions in our State pay no local taxes?

3. Extension of State aid for the *permanent* improvements of township roads. Answer that the state ought to contribute. We are not ignorant of the very many difficulties that is to be encountered in the appropriation. If our Revenue Laws were as they ought to be, the State could and should appropriate as much for roads as they now do for schools. Roads should be classified and considered under two heads, as State and county. The law specifying what shall constitute each class, leaving it to the courts to determine and designate the roads. The main thoroughfares leading from county to county or to important places, to be considered State roads, etc. The State paying a certain amount to each permanent improvement upon said roads, perhaps in proportion to the mill vale expended by the township on the same, upon the principle that he who helps himself, will be helped. Not upon the principle advocated by some, *i. e.* in proportion to the amount of State taxes paid; this would make the rich, richer and the poor, poorer. Or on a percentage to the miles of roads in the township, and not in proportion to the taxables in a township, as in many townships there are towns located in the township.

The State legislates eminent domain to an incorporation not simply as a corporation, but for the public good, and often makes large and extravagant appropriations to objects more or less worthy as the case may be. Certainly there should be no question about appropriating to roads where ALL have the advantages and equal rights.

R. S. SEARLE, Susquehanna county. The subject of public roads and highways, and how to best build and improve them, has engaged the earnest and thoughtful consideration of the State Board of Agriculture of Pennsylvania almost from its first organization to the present time. There has been but few meetings of the board at which the subject has not been discussed; and the present agitation of the public mind in regard to roads is very largely due to the action of the board. Until now, detailed methods are to be considered with the view of formulating a new road law to supersede our many and diverse laws that do not, in practice, produce the desired result in good roads, at the least cost for construction and maintenance. The present system of road tax is based on the principle of personal service, or working out on the road the tax levied, and is a relic of the old Feudalism borrowed from the statute labor of England; and its results to-day are apparent in the condition

of the roads all over the State; and if continued, will be an effectual bar to any improvement in almost all sections of the country. Then how shall the necessary means be raised to do the work? The State Board of Agriculture, after careful consideration of the subject, have almost unanimously decided that the tax levied for road purposes should be a cash tax, and this has been the expression of these attending our numerous Farmers' Institutes held in all parts of the State. There are some who oppose this view, but the large majority are in favor of it. The argument of those who oppose a cash tax is, that they have already more cash tax to pay than they want, etc. But when it is clearly demonstrated that one dollar in cash will make more and better roads than two dollars will, worked out in the old way, their opposition will cease. The present system of viewing, laying out, building, and paying of damages as practised in most of the counties of the State, is in my opinion, more objectionable, than the manner of working out the road tax is, and demands an entire and radical revision. Let any tax-payer carefully go over the county statement of expenditures, and he will at once see that a very large amount of the cash tax for county purposes is used in road views, damages, court expenses, etc., to say nothing of the extra or special road taxes to pay for opening new roads, etc. In our county of Susquehanna over \$11,000 in a levy of about \$30,000 was expended in bridges (which are only parts of a road) road views and damages, or over one third the county tax. This part of the subject on examination, develops so much that is wrong, burdensome, and unequal, that even a superficial glance at it will convince any one of the absolute necessity of an entire and complete revision of the road laws in regard to it, and we do not doubt that the able men on the road commission will so recommend.

Another question or consideration in connection with the subject of roads, will be, shall the roads be an entire charge upon the real estate and personal property of real estate owners as at present, or shall all the property of all kinds in the State pay its share of the expense? Or in other words, shall the State aid in this greatly to be desired improvement? I know that there is a difference of opinion on this point, but I cannot see why it is not just and right, that the State should largely assist in improving our roads. The idea is not new or without precedent. In the earlier history of our State large sums were appropriated to assist in building roads all over the State, in order to open up and render inhabitable the vast regions which are now productive farms and happy homes, and who shall say this money was not well spent, or that the money so appropriated, was wrong or injudicious? The State later spent many millions in what was known as internal improvements, and although it is now thought by many, in view of the fact that those vast water ways are rendered useless by modern improvements, that the money was wasted or worse thrown away. I do not believe this is true. Those improvements developed the hidden wealth of the State, and demonstrated the practicability of better means of transportation, which has led to those magnificent highways of commerce and travel that far transcend the utmost efforts of the most powerful nations of the past, and whose yearly incomes are in the aggregate many times the entire sum spent by the State, and whose annual net income far exceeds the interest on their cost. As these great arteries, veins of commerce, are only with the common roads, the avenues by which the products of the farms and mines and forests are to be moved to those who must have them, and it is admitted by all

that the present condition of our common roads are a great obstacle to the successful tilling of the soil and marketing of the products. Why may we not ask the State to appropriate a large amount to assist the counties in this work.

There is a bill now before the Legislature of New York appropriating \$10,000,000 to assist in improving the common roads of the State. If it is a proper thing for New York to do, why is it not also proper for Pennsylvania to do the same?

G. HIESTER, Dauphin county. *First.* All road tax should be payable in cash.

Second. All classes of property should be taxed for road purposes.

Third. On the subject of State aid for permanent improvement, I am not so clear. There are so many obstacles in the way of its economical appreciation, and so many opportunities offered for jobbery, that I think it would be better for each county to take care of its own roads.

If the State were to provide the means for permanently improving the roads, the first question to arise would be as to the basis upon which the appropriation should be made to each county and each township, and on this question it would be difficult for the counties to agree.

No matter what system is adopted for the management of this fund, a State superintendant, who should be an engineer of experience, must be appointed, and he in turn must have an assistant in each county (also an experienced engineer) who shall have immediate supervision of the construction of all roads receiving State aid.

This would give us, to start with, an army of at least eighty high priced men to oversee the expenditure of the appropriation.

We have no reason for supposing that they would be more faithful or skillful in the performance of their work than others have been in the past, and judging the future by the past, I am constrained to believe that the benefit to be derived by the State at large will not be in any degree commensurate with the enormous expense that must be incurred if the State is called upon to help each township to build even a few miles of road each year.

J. P. BARNES, Lehigh county. This question of good roads has been and is now agitated throughout the State. I hope it will not end in talk only, but that some feasible plan will be arrived at to give us more uniform and better roads all over the State. It is certainly desirable and much needed. It will save both horses and wagons and benefit man to a remarkable degree.

To have good roads, it is necessary that our legislative bodies frame and pass some general act, which shall provide and direct how our roads shall be constructed and maintained in a good condition for travel. The road bed should be constructed so as to prevent our winter frosts and spring rains and thaws from wearing and softening them to the depth of one foot or more, whereby they become almost impassible.

Should said act not provide a limited pro-rate to each county or township according to needs of its soil and population, authorize the election or appointment of a competent engineer to direct the construction and repairs of all the public roads throughout the entire State, having under him county and township supervisors to carry out the details required for good roads.

All road taxes should be paid in money instead as it now is, to be worked out on the road repairs which has been and now is the custom. This would give cheaper and better roads. To have permanent good roads, the only plan would be to in a measure grade them and adopt the

Telford road bed, which is cheaper than the macadam plan and would answer all purposes. Our public roads now are intended to be in width thirty-three feet; it would not be necessary to construct the road bed more than fifteen feet in width, which would give ample room for two vehicles to pass each other. I sincerely hope that some good results will come out of this road agitation; there certainly is improvement demanded and needed, all will admit.

D. P. FORNEY, Adams county. *First.* Road taxes should be paid in money. This is so obvious, that it needs little comment. The road supervisor with one or two hands and a horse and cart should be employed the whole year around on repairs, just as the repair men on a railroad are employed. They could thus work according to the teachings of the economic proverb that "a stitch in time saves nine."

Second. All property should be taxed for road purposes as well as for every other purpose for which taxes are required. We ought by this time, to have learned to our entire satisfaction, in this Commonwealth, that when once discrimination in taxation or legislation is begun, there is no end to injustice. All men and all property are benefited by good roads, hence all ought to help to pay for them.

Third. Your third proposition is very difficult of solution. Thus far we learned with emphasis, that we never have good roads when they are under local control. Hence the only other plan left is to try State supervision and construction. This conclusion is fortified by the fact that in all European countries, where good roads prevail, they are under state control: unless the power to construct and maintain good roads is removed farther from the average voter than it now is, it is safe to say we will never have good roads. In all clay soils there is but one way of making a good road, and that is by macadamizing or piking. This is expensive, and if a road supervisor is elected, who has energy enough to begin doing this intelligently, he is straight way removed at the next election, because the taxes are too high. The people themselves will never make good roads as long as they feel and see the direct taxation for the purpose, hence it must be removed from their immediate sight. Meanwhile some things might be done which would be helpful in the matter. European governments put their idle and restless population to work on public improvements. Why should not we do this? We are tolerating a system of vagabondage in this State which is a disgrace to us. The average tramp is a public enemy, and will usually commit crimes when he has the opportunity. Against him, the farmer is almost entirely unprotected. His home, his property and the life of himself and family are all largely at his mercy, and when this enemy is arrested for crime, he is too often discharged upon his promise to leave the county. That is, to go into a neighboring county and commit crime there. Just how much better we are off in this respect than are the inhabitants of some African kingdom, who are always at the mercy of any predatory neighbor who sees fit to attack him, is not so easy to see. Verily, our roads fairly gauge our civilization.

Now, why can we not have such legislation as will put these men to work on our public roads. The farmers of the State feed, lodge and to a large extent clothe them, and they have a right to demand some service in return, and the State ought in justice to compel it. An just State government ought not to permit a tramp within its borders without putting him to work.

Hon. A. O. HESTER, Dauphin county. I favor the payment of road taxes in money instead of work.

I have often noticed half a dozen of men and boys with teams and plow, not doing half a day's work, not doing it at the proper season, and not doing it with judgment. The township supervisor cannot complain, as his office is dependent upon the good will of his employes.

To the 2nd question I answer I am in favor of the taxation of all classes of property for road purposes. All classes of citizens are equally interested in having good roads. Many estates consist more largely of personal property than real; it is but fair that each should contribute to the enjoyment and safety of good roads.

To the third question, I am not in favor of State aid to the improvement of township roads. It would be but the entering wedge to the expenditure of millions of dollars, that in the end would have to be repaid into the State treasury by the tax-payer, as was the case with canals and railroads.

OLIVER D. SCHOCK, Berks county. 1. The question of the payment of road-tax in money instead of in labor. This is of the utmost importance in this era of bad and almost impassable roads, when there is a loud demand for improved road-making machinery, and a more intelligent system of repairing the highways. What is most essential is a change in the present road laws, and special efforts should then follow to elect efficient and morally courageous supervisors who will perform their duties in an intelligent, faithful and unselfish manner. The interests of the people would be best served if the cash system were adopted which experience teaches us is always preferable in private or individual transactions. The suggested change would empower those in authority to employ only such persons who are willing and physically able to perform an average day's labor. Simple justice to his constituents would demand that the other class should be ignored, although in the majority at present in many districts. It would be far better to make this distinction and exonerate the aged and indigent, rather than continue the present system.

2. The taxation of all kinds of property for road purposes is a proposition that is not in accord with the general public sentiment of this community. Those who would perhaps be the most benefited are opposed to the measure, mainly because of a vague or indefinite understanding of the theory, and because they fear that the increased income might not be economically expended and properly applied. It is conceded that some additions to the list of taxable property for road purposes might be made with propriety.

3. Any law that will aid in devising available means by which the highways may be improved in a permanent manner will be hailed with genuine satisfaction. There are many who favor macadamized roads, provided that the State would grant an appropriation for a proportionate share of the cost. This is intended to apply only to those main highways which are commonly designated as "State roads." The proposition is, that the appropriation in question should be made in a manner similar to that governing the school fund of this Commonwealth. The general consensus of opinion is that in these thickly settled counties of Eastern Pennsylvania the extension of State aid is hardly feasible or necessary.

JOHN G. CLARK, Washington county. In our county (Washington) we have a heavy limestone clay soil, good for production, but the worst kind of material for road-making. Nature has furnished abundance of limestone for macadamizing, but there is a great deal of labor and cost

in securing a firm road-bed. We have two systems of making and repairing our township roads. The plan of letting the farmers work out their taxes under supervisors is the oldest and most general plan.

In some townships, commissioners are elected and the roads divided into sections, and sold out to the lowest bidder for keeping in order for a term of years. In this case taxes are paid in money. Both plans seem to work very well where the officers in charge faithfully perform their duties.

This brings us to the first topic mentioned in your circular; should road taxes be paid in money instead of work? I think it would be an advantage, more because in working out taxes it has become a habit to get off as easy as possible, and in many cases old tools and teams are raised which make it impossible for the laborer to give a full and fair day's work. I discussing this point at our Farmer's Institute in Washington, Pennsylvania, about a year ago, I made this remark, "the habit of shirking and dodging the work has been practiced so long, the disposition now descends by *heredita* from father to son until it is impossible to get fair and honest work done." I think there is a great deal of truth in this. The boys are put on the roads very young and are taught by both precept and example to do as little as possible and deceive the supervisors as far as possible, and neither the roads nor the boys are much benefited. There are numerable exceptions, but this is too common. I therefore conclude that it would be better that road taxes be paid in money.

2. "Should all classes of property be taxed for road purposes?" I would say certainly it should. There has been no greater blunder in the past than to suppose the farmers should keep up the township roads. All classes of citizens are interested, and one almost as much as another. It is true the farmer must have a road of some kind to get his products to market, but the purchaser is about as much interested as the seller. It would be very difficult indeed to equalize taxation in such a way that each one would get full benefit, in the use of roads, for taxes paid. But many citizens of towns and boroughs make more use of township roads than the residents of the townships. Some men or firms, doing business in our towns, have teams on the roads almost every day in the year; while some farmers, especially stock-raisers, would not average one day each week. And the same is true in pleasuring as business. I could illustrate by my own case, and there are hundreds of similar cases. I live on a farm intersected by a macadamized road. All of my produce goes to market over this turnpike, and nearly all of my travel, either for business or pleasure, is on this road, and on which I pay toll for every mile traveled.

And at the same time pay a yearly tax of from forty to sixty dollars for the improvement of other roads which I use very little. Perhaps not one-tenth as much as some others who pay nothing toward the road funds. Would not justice require that those who use the roads *should* be taxed for their improvement?

3. In regard to the extension of State aid in the improvement of township roads, moneys appropriated in this way, if properly expended, would certainly do a great deal for the permanent advancement of the State. But there would be difficulties in the distribution which would be hard to overcome, and I will leave this question to others. But something should be done to encourage the making of permanent roads throughout the State. Millions of dollars have been expended in making road-beds of clay, and although it has been going on for about a cen-

tury, we are almost where our fathers began. As our population increases the travel on our roads will increase, and it becomes more and more necessary that our road be made more substantial. This of course will require the outlay of more money, and until the people are willing to expend more, we cannot have good roads. I believe all the permanent roads of the State have been constructed by incorporated companies, and perhaps this is the most practical way to secure our object. I know there is a great dislike to toll-gates, and a disposition to vote them out of existence. But can there be any way devised that will put the cost of repairs so fairly on those who receive the advantages of the road. There are but few roads, if any, that will pay dividend to the stockholders. But it will pay the property holders in almost any community to form an association and secure a charter for maintaining a road and erecting gates thereon. Not for the purpose of receiving dividends on their investment, but to secure the advantages of a first class road. I have had some experience in this line, having been president of such a road company for seventeen years. Our board of managers are all personally interested in maintaining and improving the road, and only receive a nominal sum as compensation for their services. We are putting two hundred perches of broken limestone on each mile yearly, and there is a marked improvement on the road each year, and it must become a first class road. We have never received dividends, nor never expect any, and yet every man feels well paid for his investment. I believe the same thing can be done in hundreds of cases.

H. M. ENGLE, Lancaster county. That a change is needed toward the improvement of our public roads, is no longer a mooted question, even among those who pay the road taxes at present, but their views on the methods vary greatly. Many favor better roads without additional expenses, which may be possible to a certain extent; but real estate owners claim that they are already over-taxed proportionately with their income; farmers especially hold out this plea, and with good reason.

However we live in an age of progress, requiring more comforts than were allotted to our forefathers, and comfortable roads are not the least within reach.

No doubt there is room for better methods in common road making, but without stoning, on the McAdam or Telford system, or both, of certain portions at least of the public roads, they will not, and can not be made to satisfy the demands of our progressive age; or I might say the progressive portion of the population of this age, for upon this class improvements of all descriptions will depend. Time is too precious to wait until laggards get out of the old ruts and consequently they must be helped out. Too many cling to the antiquated notion of our present law, that they must have the privilege of working out their road tax, and the law should at once be repealed, and none but able and well qualified workmen be employed, which would in the end be a benefit, even pecuniarily, to those who insist upon working out their road taxes, as any farmer whose attention, and the labor of his employes, is not worth more on his farm than on the road at the time roads should be repaired, has mistaken his calling.

Public sentiment among the rural population has become deeply rooted, that all classes of property should be taxed equally, including for road purposes, and legislators who ignore this sentiment, will some day find themselves left.

In order to facilitate the necessary improvements in the public roads, State aid should be granted to the townships on certain conditions.

- (1). That the appropriations shall be for stone roads only, which must be made on the most improved methods consistent with economy.
- (2). That a competent person shall be elected by each county under whose directions the supervisors of public roads in their respective township shall construct the said roads.
- (3). That the State appropriations shall not exceed a certain amount for each township annually, for a term of years.

A law embracing at least some of these principles would not fail to induce some townships to improve road building, which would be followed by others until every township in the State would avail itself of the benefits of the laws, as has been the case with our common school law. That such a road law as I have sketched would meet with opposition similar to that which our common school law met with, but like the latter, once the entire State shall be predated with good roads, coming generations will bless those who inaugurated the improvement.

S. E. NIVEN, Chester county. The question of improving the manner of repairing the public roads is one that is receiving deserved attention. Possibly we may gain something by considering the defects in the present system. In this township, (London Britain, Chester county) the repairing of the roads is sold in sections to the lowest bidder for a term of five years. We find that men who are honest and conscientious in dealing, men who would not wrong a neighbor out of a penny even though there was no written agreement or no witnesses to their bargains, yet these same men will sign a contract with the supervisors which they do not attempt to fulfill. Of course it is the duty of the supervisors to see that each section is kept in repair according to the contract, but we have never been able to elect men who were willing to quarrel with their neighbors, which would be the certain result if these officers did their duty. A supervisor who would attempt to compel even the partial fulfillment of these contracts, would soon have many enemies, and would serve but one term, as he could not possibly be re-elected. We pay each year more than enough money to have good, and have very bad roads.

It was suggested at the Farmer's Institute at Oxford that the farmers should keep in repair the roads passing through their farms in lieu of road tax. It was claimed for this plan that each farmer has teams and laborers, that he would take pride in having good roads through his land, that he uses such roads most frequently, and would have a constant supervision over them, that such repairs should be in lieu of road tax would probably not be just, as I find I paid last week \$105.28 road tax, and received for agreeing to keep in repair all the roads passing through the land in which this tax was levied \$46.40. We have paid for each of the last five years for repairing roads, \$727.04, or a total of \$3,635.20, and there is at this date nothing to show for is outlay. These years were but a repetition of those that preceded them, and an enormous amount of money has been expended without any permanent improvement.

Repeal the law authorizing the selling of the repairing public roads. Elect one supervisor, and chose him as you would select a man to transact other business for you. Do not inquire what political party he favors or who he voted for for additional law judge, have no regard for his views on the tariff, but elect the one man of all others in the township who is best qualified for the position, and who will do his whole duty, without fear or favor.

As this township is very small, a supervisor at \$1.50 and two laborers

at \$1.25 each, or \$4.00 a day for seventy-five days, with all the best implements and machinery furnished them, and with a team at the same cost, would put our roads in good repair for \$6,000, then we would have left of our present outlay \$127.04 for supervision and occasional repairs during the remainder of the year. In larger townships the supervisor should have enough men to keep the roads in repair by being constantly employed on them.

Collect double the present amount of road tax and expend the surplus in permanent improvements. As the roads are thus gradually improved, the expenditure for repairs will be correspondingly lessened.

Repeal the law compelling the supervisor to notify men to work on the roads and collect the tax in money. We have old men who are assessed for road tax thirteen cents. If the supervisors employ them they pay each \$1.25 for one day. Consequently they pay no taxes it is economy to exonerate them.

The question of a just equalization of taxes is a very difficult one, yet they should be so adjusted that all classes of property will bear a fair proportion of the burden of taxation.

The State should aid in the permanent improvement of township roads but not by an appropriation from the State treasury. The county treasurer should not collect taxes and pay to a State Treasurer, and he pay a portion of it to the supervisors. We are now receiving this kind of State aid for the support of our schools. We pay State taxes on or before September 1, in each year, and more than a year after a part of this money is paid to the treasurer of our school board. The last Legislature made an extra appropriation for the support of the public schools which was approved May 20, 1889, but the money has not yet reached the townships. Let the State pay its necessary expenses from revenue from other sources and allow each township to keep the taxes now collected from its citizens and paid into the State treasury.

I. F. CHANDLER, Chester county. The payment of road taxes in money will be right whenever you tax all classes of property for that purpose, which I think should be done and would be right and equitable as was intended by our constitution, but under the present road law, defective in many points as it is, I think that the payment at least of part of the road tax in work, is a relief to a greater part of our farmers, as it seems to be that the greater part of the road tax comes off the farmer. If the continuance of the present laws are to be the same as in the past, I would favor a law allowing the road tax to be paid by the corporate and personal property, and by this way relieve the owners of real estate from the payment of any road tax. In this case aid from the State might be of value in the improvement of our public roads.

The chief defect in our present law is the finding of a man suitable for the office and the pay of such a man. If you have a man capable of filling the office, the pay is insufficient to recompense him for the time and trouble, to say nothing of the ill-will and abuse of his neighbors. I think the foregoing will be enough to inform them that we need a system or law that will enable the counties of the State to build a permanent highway not only fit for summer use, but for the convenience of travel in the winter season.

A. C. SISSION, Lackawanna county. There are certain self evident facts and conclusions that present themselves to all who have given the subject careful consideration, among which are the following:

- First.* A general revision or repeal of all the road laws of this State.
- Second.* The payment of all taxes for road purposes, in money instead of labor.

Third. The taxation of all classes of property for road purposes.

Fourth. State aid is necessary for the permanent improvement of township roads, which should be paid to each road district as a premium for the construction of each mile of road or fractional part thereof over one mile and not over five miles in any one year; said road to be made according to plans and specifications which shall be established by law; said premium to be at a uniform rate throughout the State, payment to be made whenever said road shall have been inspected and approved by the county commissioners of the county when said road shall have been made.

Fifth. Some material other than the common soil is absolutely necessary for the making of permanent roads.

Sixth. A macadam road varying in width and thickness according to circumstances the most practical of any in use.

Seventh. There should be one road commissioner elected in each road district at the February election of each year who shall serve one year, and have a salary of three dollars per day, for every day in actual service, and shall give good and sufficient bonds for the faithful performance of all the duties required by the office.

Eighth. Any law that contemplates an increase of salaried officers, we believe would be inimical to the best interests of the tax-payers of this Commonwealth.

Ninth. Each road district should decide at the February election how much road should be built each year, and locate the same by a majority vote.

Tenth. The premium to be paid by the State should be equal to one-half the actual cost of road made.

J. B. PHELPS, Crawford county. To the first question I answer, I am in favor of road tax being paid in money, with the privilege of the taxables along the road having the first chance of working out their tax under the command of a general superintendent or road master appointed or elected in each town, said taxables to be allowed the same wages and to do the same amount of work as other laborers, and to work when called upon by the road master, or pay the money. My reasons for this, is to get a uniformity of roads in each township on a certain system under the direction of a skilled road master who knows what he wants and will have it if given the power. The reason for allowing the taxable along the road the privilege of working out their tax is, it is possible and quite probable, that many has not the money to pay their tax unless putting them to distress, but they have plenty of brawn and muscle that they can use to advantage, but they should be forced to work under the direction of the road master.

Second question. The taxation of all classes of property for road purposes. I answer emphatically yes. All property should be taxed, not only for roads, but for all the taxes. My reason for this is brief. On the true and broad principles of justice and equality, as long as property is a basis for taxation, why not let property, all property, pay an equal tax? It seems to me that comment on this question is unnecessary to the unselfish, and the selfish should be forced to pay their just dues.

Third. The extension of State aid for the permanent improvement of township roads. This I suppose means macadam roads as permanent improvements. This question I am not as decided upon as I am on the two former questions. I think it depends much on what our revenues are and from what source they arrive. Under our present system of

taxation I should be in favor of the taxes from corporations, &c., be increased to a par with farm property, and then the State appropriate such funds as it could spare to each township (similar as the school appropriations now is) for permanent improvements on public roads. And that every township in the State should decide what those improvements should be, macadamized or otherwise. I am not in favor, by any means, of making a law compelling every township in the State to make a macadam road, such a law would be unjust, as the most of the counties of Erie and Crawford and Mercer have not the material nor is it available. But the towns where the stone are available and the travel is great, macadam roads would be the cheapest, but this, I insist, should be left to the township.

It appears to me under existing circumstances a word of caution might be appropriate. We have had the past year an unprecedented season. A season that could not be surpassed for mud making, and in all probability the like we will not see again for some time. Therefore, we should go slow how we legislate, or under the impulse of the moment we may heap upon ourselves a debt that this generation will never see extinguished. 'Tis a mooted question with me whether any macadam road would pay under any circumstances in Crawford county; I am sure it is not favored by one-eighth of its inhabitants. But we want better roads, and a law based upon the views I have expressed, I believe, will make them.

J. S. WILLIAMS, Bucks county. 1. All taxes, including those for road purposes, should be paid in money, thus leaving the road superintendents at liberty to employ the best help in the labor market on the best terms.

2. I favor the taxation of all kinds of property for local purposes, and for that matter, all purposes, if necessary. It seems to me unjust that land, when assessed at its full market value as it now is, should pay from ten to fifteen mills tax while the mortgages secured on it should only pay three mills. If favor taxing the owner of land for *only* what *he owns*, that is, deducting all registered liens thereon from the assessed value of the land, and requiring the owner of those liens pay the taxes; as it now is, a farmer owning land valued at \$10,000 dollars, pays from one to one hundred and fifty dollars tax thereon; while his neighbor, whose money is differently invested, pays but \$30 on the same valuation, receiving at the same time equal benefit from the roads, schools, &c. The case is doubly aggravating when a part of his money is invested in his neighbors' farm for which the neighbor pays all the taxes—except the three mill State tax.

3. Should taxation be equalized there would be but little need for State aid for road purposes. Should State aid come to benefit the roads, I think it should be applied to a few of the leading roads of each county which should be made and repaired entirely by the State. I should not approve of putting Township affairs in charge of State officers.

So far as legislation is concerned, that upon taxation, which seems to be the most important, "is answered in reply to questions 1 and 2."

I would approve of a law making it obligatory upon each township to thoroughly stone or gravel a certain percentage of the mileage of the roads in each township not exceeding two per cent. each year as long as needed. When townships are divided in two sections, the road improved thus should be equally divided between each section.

I think it would be well to have a law authorizing supervisors to buy, lease or take (as lands for school purposes are taken) land for road

improvement, which may contain stone or gravel of good quality for making or mending roads. A local turnpike company bought many years ago three acres of land containing a gravel bank for less than two hundred dollars, which has been worth more than that amount to the company every year since for the gravel used.

I do not think it would be advisable or practicable to have all or near all our own roads turnpiked. A few of the most used roads with bad sections in others, would probably be more satisfactory than to attempt too much. Turnpikes are expensive to construct and to keep in repair, while a turnpike out of repair is a nuisance, a bad road all the year, while a good dirt road is preferable to most turnpikes nine months in each year.

My feeling would, therefore, be to work cautiously but thoroughly and not expend more than can be raised by a fair rate of taxation, or can be adjusted valuation of taxable property. I am decidedly opposed to raising large amounts of money by borrowing and thus place a permanent burthen of debt on the townships which I can see no way cancelling.

Hon. G. D. STITZEL, Berks county. 1. I am opposed to the working out the road taxes followed in so many districts in this county, as well as in other counties in the State. I do not believe in the policy of doing work on the "pic-nic" plan, unless those engaging in it give their services gratuitously, as is often done in farming districts where the farmers will have "stone matches," for instance, on their premises, for the purpose of clearing a piece of land, and then celebrate the occasion by inviting the neighbors and friends who have assembled to partake liberally of refreshments. All work done on the public roads should be paid in cash, upon the principle of a full day's pay for a full day's work.

2. I believe in the taxation of all classes of property for road purposes. The farmers are already sufficiently taxed, and their burdens should not be increased.

3. I am heartily in favor of the extension of State aid for the permanent improvement of township roads. There is a much stronger argument for the State assisting in the maintaining of roads than for the maintaining of schools, for the reason that the roads are the property of the Commonwealth, opened, repaired and kept in condition for all the citizens of the Commonwealth, at all times, while the schools are only for the education of the people of the district. The State should extend assistance in this direction. One trouble with country roads is, that there are too many of them. Nearly one-half of them might be vacated to the advantage of public travel. I have no suggestions to make as to the manner in which the State aid should be applied, but no plan will meet with favor which will tend to increase the road taxes of the farmers.

JOHN McDOWELL, Washington county. *First.* I am in favor of road taxes being paid in money.

Second. I am in favor of all classes of property being taxed for road purposes.

Third. I am decidedly in favor of State aid for road purposes, to be applied only to the main or leading township roads.

In addition, I suggest the following: That all teamsters who haul into or through townships, be required to pay a license in each and every township through which they haul or drive.

My reasons for this is, that many teamsters from other states have

been hauling for years over our roads. As many as sixteen heavy teams from Ohio and more than this number from West Virginia, have been hauling every day in our townships, and many on the Sabbath, thus destroying our roads and bridges and pay no toll nor tax whatever. Cities and towns require teamsters to take out license. Townships should do the same.

There should be a practical civil engineer to be appointed by the court of quarter sessions, to hold his office for a term of three years, his compensation two dollars and fifty cents a day, to be paid out of the county treasury, his duty shall be to oversee all work and have the roads repaired on the grade of original survey or plot and have all roads opened to thirty-three feet. All side drains, culverts and water ways to be kept open and in good repair. All road beds to be kept smooth and rounded up in center. All State aid and part township tax to be used in macadamizing soft or marshy places, and to continue year and yearly to stone the road bed as far as funds will admit. He must settle his account with the auditors.

Supervisors to be elected by the people each year. Their duty should be to levy the tax on duplicates furnished by county commissioners. They shall be under the direction of the civil engineer, and do all work as he directs. They shall employ labor and teams and continue the work from day to day, as the engineer may direct, reserving a part of the funds for repairs needed, caused by floods, rains or washouts; they shall employ a full force of hands so as to speed the work, and in order to keep the office out of politics their compensation shall each be one dollar and fifty cents a day, and they shall be owners of real estate in the township where they survey.

They shall keep a daily account of all work where and when done, and the cost of all work and material used, and make settlement with the township auditor.

The treasurer should be elected by the people for a term of two years. He should give bond for double the amount of the tax duplicate. He should collect all taxes and draw the amount appropriated by the State, and pay out the same upon order of the engineer to the supervisors, and he should allow a rebate on all taxes paid at his office on or before the first Saturday of May each year. On all taxes not paid by the first of August, a penalty of five per cent. attaches, and thereafter, a monthly additional penalty of five per cent. attaches, and ten per cent. for collecting by law and costs of suit, to be commenced the first Monday of December.

The treasurer should settle his account with auditors and should publish a statement of items in one county paper near to their township. Where damages are claimed against the township, the engineer should examine all cases, and if he finds the accident happened off the traveled part of the road, the township shall not be held liable; the traveling public must take all risks when the horse or vehicle leaves the traveled part of the road. Where accidents occur and the engineer finds by actual measurement the road at the place of the accident is less than thirty-three feet wide, the party damaged may recover by suit from the land owner whose fence encroaches upon the bounds of the road.

All persons who obstruct the road by wood piles, implements, or feeding of stock, shall be held liable to damages.

The highways belong to the public, the public have rights that must

be respected. The whole public including manufactures, corporations and banking institutions should help to keep up the roads by a tax paid into the county treasurer out of which the engineers are to receive their pay; county commissioners to estimate and levy tax for this purpose.

ROBT. K. TOMLINSON, Bucks county. It seems to me that the great defects of road mending as now attempted, rather than done, in this locality, are as follows:

First, It is not pursued as a business or occupation by any one; hence there is not the requisite skill and experience acquired to deal effectively with the difficult and varied circumstances of the road problem.

Second, The supervisors, elected presumptively to fulfill their office only a short time, have other business which they consider paramount in importance, and hence neglect the roads at critical times.

Lastly, The exigencies of their main occupation and also that of the farmers who assist them, require them to go over the roads hastily, looking rather to temporary repair than to permanent benefit.

To lessen the above defects I would suggest the following changes:

First, That only one supervisor should be elected in each township, and at such a salary (made possible by the fewer number) that it will be an object for men to fit themselves for the position. To aid in such education, I would have a county superintendant elected by township commissioners and bearing much the same relation to the supervisors as the county school superintendant does to the teachers.

Second, I would have the supervisors elected for a term of three or five years, and with the understanding that their whole time and services should be given to the roads. I would have the township furnish also a team of heavy horses, a plow, dumping wagons, a road scraper, a stone breaker, &c. Also a shelter tent for horses and men when in distant parts of the township from the central station. I would have the township furnish one, two or three steady laborers at a less salary than the supervisor, who must be, not merely an overseer, but the head worker in the force.

Third, I would have farmers and others hired to assist only in the stone hauling, when they should be paid not by the hour, but by the number of perch of stone hauled per mile. I would have county roads declared necessary in the county in the same manner that county bridges are, and these made and kept in repair by the county, with the paid assistance, when desirable on both sides, of the township force.

Lastly, I would have a road commission elected in each township of three men to serve, without salary, as an advisory and arbitrating committee on disputed points, and to have full charge of the funds of the township. Perhaps it would be better to have them to still more nearly correspond to school directors and have them to appoint and control the supervisors, &c.

J. T. JENNINGS, Susquehanna County. We have too many roads; better have a few roads well graded and constructed than a greater number unfit to travel and practically useless. Originally the settlers located on the hills, and in many cases the roads followed the paths which had been made to accommodate travel without reference to hills. In too many cases the roads are still located on the original path. Individual interest too often operate in the location of a road and cause it to go over a hill when public interest would place it on more suitable ground.

Great care should be taken in the selection of proper persons for

viewers, and only an experienced, engineer, with the best of judgment, should be entrusted with the work of the laying out a main line of road; too often we suffer from the work of incompetent viewers and only learn the cost of the error after it is too late.

There is no doubt but that macadamizing is the best, but such a road is very expensive, and all sections could not afford the expense. Such work could only be done on the leading lines of road and then only on a small section at a time.

How shall we expend our road taxes to the greatest advantage? Shall they be worked out or shall they be paid in money? There is not a shadow of doubt that better results could be secured by a money tax, and it must eventually come to that. Our farmers are now suffering from an over burden of taxation, and I hardly think that a law requiring the payment of the road tax in money would be popular.

In regard to the taxation of all classes of property for road purposes, I can see no reasonable objection. It is not right that farmers should build and repair the roads and that all other kind of property should go free; others use the roads and should share in their construction and repair.

The first thing to be taken into consideration in making a road is the grading lengthwise, avoid as much as possible dead levels. I have often seen a road left for years which, if graded, would have been a great deal easier on the teams and the road would wash far less. This is generally pretty well understood by our supervisors, but they are too fearful about incurring the first expense unless the hill be a very short one. This operation of lowering grades becomes of much more importance when the roads are macadamized.

The next thing to be considered is the grading of the cross sections. There should be a gradual rise from each extremity of one-half inch or a little over to the foot to the center, not making any provision for a ditch. A ditch with perpendicular sides concentrates the whole force of the water into that space, and is a constant source of damage to the road; if the road is graded from each extremity like this when there is a large amount of water running, it has a chance to spread out and a large proportion of it is so shallow that it has very little force.

But the all important point is to make the road of such materials that it will be so hard that a loaded wagon will make no impression upon it, causing no rut which will serve for the collection of water, and so even on the surface that there shall be no rising of the wheels of wagons on the top of lumps and then falling down to a lower surface, thereby crushing the material of which the road is composed.

No positive rule can be laid down for the material to be used in the construction of a road, as it must, in large measures, depend on what can be found in the near neighborhood; limestone where it can be obtained is generally considered one of the best.

When the material has been decided upon, it should be broken small enough to go through an one and one-fourth inch riddle; all that will go through a one-fourth inch riddle is not fit for use; all that will not go through the larger riddle must be broken over. This is essential to a perfect road. When the material is prepared and the road graded, the broken stone must not be let drop from a wagon as that will never make an even road, but it should be sown broad cast with a shovel from a wheel-barrow when the surfaces of the road bed is dry and firm.

The bed of broken stone must be at least ten inches thick. With a few days travel if the loads which pass over it are not so heavy as to

displace the stone, the surface will become even and compact. Whenever a road needs repair it ought to be attended to at once, and the proper way to do it is to put on a very thin coat of broken stone prepared and applied as at first, but before the application, parallel lines should be drawn about ten inches apart with a sharp pick across the road not more than a one-half inch in depth which will facilitate the combination of the new stone with the old bed. Mud must never be allowed to accumulate on a road as the stone will wear a great deal faster when wet than when dry. If your road is kept in proper shape and clean of mud it will require very little repair.

H. H. BROWN, Columbia county. The time has arrived that the laws for road making should be changed, so that the tax should be paid in money the same as all other taxes and collected and placed in the hands of the township treasurer. Then only to be drawn from the State by an order signed by the road supervisor, and countersigned by the township clerk.

The road supervisor should each spring examine the roads in their township and make an estimate what the cost will be to repair and keep in order the road during the next year (except for permanent improvement.) And after giving public notice of the time and place by posting in several places in the township that there will be a letting of the road repairs and keeping the same in good order. At that time the supervisor with the town clerk shall constitute a board to receive such bids and to examine the same, and if any bid is satisfactory, then and there they to enter into a bond and contract with the lowest and best applicant to the end that the roads shall be kept in good repair during the year. The pay of the supervisor and town clerk shall not exceed two dollars per day. Any difference arising between the contractor and supervisor in regard to the settlement of any extra work, shall be referred to the auditors whose decision shall be final.

All classes of property should be liable for road tax. For the real estate is now over-burdened with taxes, and to properly repair and construct the roads, it will be necessary to have more funds, and as there are many classes of property now exempt from paying road or local taxes, it is nothing more than right that they should bear some part of the road expenses. For the permanent improvement of the roads, I believe the State should give some aid. From what source the State should receive that money to appropriate to the several counties and townships for road purposes, I can not say. But I would suggest that the State appropriate a sum for each township for permanent improvement in ratio according to the last triennial valuation of its real estate. Such sum to be expended in the crushing of stone for the macadamizing of a certain portion of the road each year. I believe that if several townships owned an engine and stone crusher which could be mutually used during the season, and such stone hauled and filled in on our roads at least six inches thick in the center, they would become a permanent road bed. The owner of land having stone would be benefited two ways; by having the stone removed from his fields, and again by having good solid road to drive over in going and coming from market. In our township we have limestone which is used on the roads in the Eastern portion, and it makes a complete road; but in the western end we have clay hard-pan soil for road beds, and the limestone spalls have to be put on very thick or it will not make but little improvement. Although we can see the benefit to a certain extent for years, for when nothing has been put in the roads but earth, they are almost impassable with mud; where the stoned roadway is it is dry and hard.

JULIUS LEMOYNE, Washington county. That each county shall have three road commissioners, one elected or appointed each year, to serve three years, whose duties shall be same as the road viewers as now appointed by the court.

That each county shall have a competent civil engineer appointed annually by the court, who shall accompany the road commissioners in making new roads or changing old ones; the matter of damages and benefits shall be subject to appeal and testimony before the court.

That on leading or important roads where the grade and road bed are satisfactory to and approved by the road commissioners and engineers, that adjacent owners shall pay two-fifths, the township one-fifth, the county one-fifth, and the State one-fifth of the cost of macadamizing or other method of constructing a permanent road as shall be best suited to the locality where it is constructed.

All such improved roads shall be subject to inspection and approval of road commissioners and engineer, and no payments shall be made by State for less than five continuous miles in length. No payment shall be made by county for less than one continuous mile in length.

The width of all such improved roads shall be determined by road commissioners and engineer.

In making, repairing and maintaining all township roads, I am in favor of local or township supervision.

1. Yes, all road tax should be paid in money.
2. Yes, all classes of capital should pay.
3. Yes, answered more fully above.

D. Z. SHOOK, Franklin county. To your first proposition, "the payment of road tax in money instead of work," I will say that I can see no great reason why the farmers should not be allowed to work out their road tax when they so desire. It has been claimed by some that the service thus secured is poor and unsatisfactory; but why a supervisor, if he be the right kind of man, should not demand and secure as full a day's work for a full day's pay under this plan as when the tax is paid in money, I do not clearly see. True I have known of cases in my own district in which supervisors have allowed farmers, as well as others, to put in half grown boys as full hands, who could not render adequate service, showed favoritism in many ways, made the roads in a slipshod manner, and allowed the township to be taken advantage of in innumerable ways. But it was all clearly the fault of the supervisor and not the fault of the system. To make road tax payable in money alone, would be an unnecessary hardship to a large class of farmers who are scarce of cash, but who have laboring help plenty and would not, unless we had the right kind of men for supervisor, be of any advantage to the township. We have had in my district time and again supervisors elected through sympathy because they were entirely unable or unfit to support themselves in any other way or calling, and herein lies the great difficulty. Without experienced, good supervisors, we will not get good roads under any plan.

To set aside one mill of the tax on personalty for road purposes, payable of course only in cash, and allow the present tax on real estate to be worked out when desired, under a proper and efficient supervision, would no doubt make an improvement and would be acceptable to a large majority of the farmers.

Your second proposition, "the taxation of all classes of property for road purposes," if it implies that all classes of property should bear equal burdens, does not meet with my approval. It would be very im-

practicable and would, if enforced, work injustice to the debtor class as well as the capitalist. Moneyed capital being extra hazardous as an investment and having in addition to bear equal burdens with real estate, will seek other channels of investment and the borrowing class will not be accommodated with the ease, nor at as low a rate of interest as they are now. As to the capitalist, the State limits him in what he shall make out of his money, but on real estate he may make all he can. Should the State tax this moneyed capital any more than at present, it will have to raise the limit of legal interest above six per cent. or rather let moneyed capital stand equal with real estate and allow it to make all it can. Either way the borrower is bound to be the sufferer.

Your third proposition, "the extension of State aid for the permanent improvement of township roads." I have already indicated how a portion of the three mill State tax on personal property could be set aside for road purposes. It would be the plainest act of justice for the State to aid us in maintaining good roads throughout the State. Farmers are not the only class of people who use the roads. The town and city people all use them. The commercial drummer is continually on them, the manufacturer sends his goods over them, the bicyclist rides over them, and the rich summer tourist takes his family driving over them, the huckster gathers in the toothsome spring chicken over them, and I end my enumeration with the undertaker who finally drives us all over them. The roads should not only receive State aid, but they should be divided into three classes. 1. Those leading to important points or from one town or city to another. 2. Those leading to points causing much travel, but not really through roads. 3. The by-ways and roads leading from one road of the first class to another road of the first class, &c., &c.

Dr. J. P. EDGE, Chester county. There is a growing and reasonable sentiment in this section in favor of making and mending the public highways on a business basis. That is, for the money to be raised on all classes of property benefited, and spending that money to the best advantage, under skilled management and effective labor. Wiping out the old shovel brigade as a thing of the past. The generations that have preceded us were in a measure content with such roads as a false economy supplied them. But the man of to-day, with his lighter running gear, improved machinery, and better horses, with more occasion for using the public road, wants something better and should have it.

In incorporated towns and cities, all property is taxed for local purposes; it is spent largely in the construction of paved streets and water ways to carry off surface water, and this is done for the convenience, not only of the residents, but for the benefit of all persons outside who may use the streets. Now is it fair that one kind of municipalities shall do this and another be exempted. Or is it not fair to expect that when the townspeople are called into the country, they shall find as well kept roads as they provide at home for their country cousins. The town in which I live, Downingtown, is badly governed; this is admitted by the tax-payers especially, and yet with numerous jobs and much extravagant methods in vogue, we Telford our streets, every year extending the mileage of paved, curbed and guttered highways, until as a general thing we have an admirable system of roads for a town of 2,500 people. The borough tax rate has not been higher than four mills so far as I remember, and this rate pays all expenses including interest, salaries, &c.

The property holders have been many times compensated for the expenses incurred, and could not be induced to go back to slushy roads. This would be the result in a large majority of townships; but of course no one expects to see all roads telforded at once. The proper thing will be to go steady, but not too slow. Do the worst roads first, and the others will follow per force.

In view of the near future when the State shall be rid of her debt, I do not know a better way to absorb the large and steadily increasing revenue than by a system of distribution among the counties, similar to that of the school funds. Not having looked into the constitutional question, I cannot say what of that. The learned jurists must fish in that stream.

H. W. NORTHRUP, Lackawanna county. One great hinderance to having a good public road, is the usual method adopted of working out an individual road tax.

The intention of this system undoubtedly was originally good and economical, but the result is not satisfactory. It is an established fact that farmers as well as others take advantage of privileges, and do not perform the same amount of labor, neither do they do it as permanently and skillfully as could be accomplished with a much less amount of tax, when that same tax was paid in money. The farmer says the times are too stringent, he can not procure money to pay this tax. It would be a burden in many instances to enforce a law requiring him to pay this tax in money. It is true that the farmer's dollar usually comes hard, but his time is the most valuable on the farm in planting the seed and cultivating the growing plants, just when the work can be the most judiciously performed in constructing and repairing the public road. It is evident then that either the road or the farm must be neglected, if the farmer works out his individual tax. If then the farmer's business is worth anything to him, he can secure as much value for the time occupied on the road, in strict attention to the cultivation of his own products.

If this is true with the farmer, it is certainly true with every other business, and we conclude that a money tax is the most desirable and economical. There is another consideration of this topic where a change in the source of taxation would better the consideration of our public roads. If all classes of property was taxed, real estate would not be burdened to the extent that it is, and the appropriation for road purposes could at the same time be greatly increased.

It is said on good authority, that real estate in Pennsylvania pays nearly four-fifths of all the taxes. For this reason as well as others the farming is struggling with financial difficulties. The public road is a universal benefit. It benefits all classes of business and occupations, and it is no more than just that the cost of construction should be equally born in proportion to any capital we may possess. The fact stares us in the face, that there is a very great deficiency in means provided to meet the expense of properly constructing permanent public roads. A macadam road is undoubtedly the best of any we may hope to obtain, and yet we cannot anticipate that to any great extent, unless we receive State aid. If the State of Pennsylvania should see fit to enable us to make our most important throughfares stone roads, then we would be in position to take care of the rest of our roads that may be considered less important.

Roads can be more economically constructed now than ever before. The invention of road machinery is accomplishing wonders. A dirt

road can be put in repair at much less cost than with the old farm implements of plow and scraper. A permanent road of stone can be built at less expense by using the patent crusher. But our public roads in the great State of Pennsylvania are so numerous, that it requires a vast amount of capital to make them permanent and desirable. The fact that our toll roads, though very expensive in their construction, are paying satisfactory dividend, is a sufficient guarantee that money could be saved in constructing permanent roads for the benefit of the traveling public. The material for the construction of such roads is abundant and convenient, especially throughout north eastern Pennsylvania. Some portions of the State will encounter greater difficulties. As the road question has been so thoroughly agitated all over the State during the past six months, it is expected that in the near future we shall have better roads and a better system of keeping them in proper repair.

DAVID WILSON, Juniata county. I think there can be no room for doubt in the mind of any man who will consider this point candidly. The trouble has been and is now that too often our supervisors are not suitable men for the office. They have not energy enough to push work as they are too modest to insist upon a neighbor doing as much work in a day for the township as he would expect to have done for himself. The office of road supervisor is really a very important office. He holds in his hands, in a measure, the property of his neighbor, and is accountable for the judicious and honest expenditure. He ought in all cases to be a practical man, with knowledge enough on the one hand to know how to make or repair a road, and energy enough on the other hand to get a good honest day's work from every man or team he employs. He should be made responsible to the public for the well keeping of the roads, and liable in damages for neglect of duty; and of course, should receive a fair compensation for his services. Don't say that such men cannot be found in every township, or if found, will not serve. The time is not far distant when the good road maker will be looked upon by his neighbors as a public benefactor; when the public will realize that good roads really and rapidly enhance the value of property; that good roads will not merely enhance the value of your broad acres but will considerably reduce the cost of your transportation, not merely in time and distance, but in the wear and tear of horse flesh and machinery; and then whether the old folks or the young folks wish to take a ride for pleasure, as a rare respite from their daily toils, or to pay a brief visit to some of their friends, how much is the pleasure sweetened by the consideration that you can speed along over the hard, smooth, level road, so safely and delightfully. Good roads are evidences of the advance of civilization in every country that is civilized. The Appian Way, a solid road built in the palmy days of the Roman empire by Appius Claudius, is a good road to this day, and some of our countrymen have travelled through the valley of the Rhine, and have ridden on bicycles even by moonlight to the top of some of the highest mountains of Switzerland, and have ridden down the same mountains much faster than you would like to ride a horse down. The supervisor should magnify his office, and should be honored by the people, if he fully and faithfully discharges his duties. As a general thing, the men who are not too ready to offer themselves for office, or too eager to obtain it, make the best supervisors. If the tax is paid in money he can expend every dollar of it in the township, and will thus be able to procure the most profitable labor, and need not be bored by

ignorant, lazy, or inefficient hands. Upon the whole, therefore, as nearly as I can gather the public sentiment, the old law of each township electing two supervisors, making them responsible for making and maintaining the roads in good condition cannot be improved upon. If they fail to find such men, it is not because the township does not contain them, but probably because some one less suitable and less desirable is more anxious for the office.

More work and better will be done by good supervisors according to the present method than by any other, if the people choose the right men for the position and give them a cash tax. But if they choose lazy, selfish, ignorant or incompetent men upon themselves be the loss. In conclusion on this point, therefore, I would say that public opinion is in favor of the clause of the old law that provides (1.) for the election of two supervisors in each townships, and (2) that the tax be paid in cash.

2. *The taxation of all classes of property for road purposes.* Every body needs roads, every body uses roads, a civilized community cannot exist without roads, nor can any advancement be made in human society without road making. The junction of the Allegheny and Monongahela rivers, and "Kittanning Point," were landmarks well known to the wild and savage tribes that used to roam over these mountain wilds. And if these untutored red men had continued to occupy these forests and mountains, there would have been nothing to resemble a road but the blazed tree, the battered rock, and perhaps here and there a scarcely perceptible path on the sloping mountain side, though many a warrior's foot may have trodden it. Have you ever thought of how much roads have done for the civilization of Pennsylvania? How much they have contributed in a thousand ways, and are now contributing to the population, wealth and happiness of the people? What an indispensable necessity they are to the safety, preservation, improvement and even the acquisition of property? Why then should not all classes of property, now taxable for other purposes, be also taxable for road purposes? We can see no reason whatever why it should not, and we believe that the large amount of property now exempt from taxation for road purposes imposes an unjust and unreasonable burden upon those who make the roads, *i.e.*, the farmers and land owners.

3. Should State aid be extended for the permanent improvement of township roads? When we consider how numerous are the progeny, and how few and small are the sugar plums to be dropped from the mother's lap, we cannot but think that however kind she may feel, it would be an impossibility for her to satisfy all that would be crying for favors. We think this would be impracticable. It is true legislators sometimes appropriate public money for unwise purposes, and often for unconstitutional purposes, but the public treasury is not to be raided for all purposes. The freedom taken for the last few years in our National as well as our State Legislature of raising committees to travel over the country in the summer may be every pleasant junketing parties for the committee; but a due regard for the public treasury on the part of our legislators would make these raids less frequent. The treasury should be sacredly guarded. The taxes already are almost unbearable, and by the time they are all paid, there is but little left, either to landlord or tenant, but especially to the tenant.

A. SHARPLESS, Chester county. *First*, As to the payment of the road tax in money instead of work? The extinguishment of road tax by the method stated, (for it don't pay anything,) has long since proved

a failure; the supervisor gets but little, if anything, in lieu of the tax assessed.

The tax payer looks upon his share of the contract as "payments for a dead horse," and gives as little as possible.

The labor furnished is generally inefficient and grudgingly given. At times suitable for the repairing of roads, farmers require the assistance of all able help they can command on the farm, so that the old men, boys and half hands are turned in to work out the tax at full wages, if the supervisor be a good neighbor and clever fellow.

From observation I judge that with the tax in hand, any intelligent supervisor could, with experienced labor under good discipline, do twice the work accomplished in a given time by the mixed party, who are too apt to meet on the roads for jollification rather than to do any efficient work.

At least three fourths of our supervisors know nothing of road making other than the defective methods handed down by their predecessors from many generations past. They have no idea of new or scientific methods that might be adopted, nor could they apply the same with the help of the mob labor now furnished by tax payers.

Of the supervisor and his workmen, the latter know as much, or perhaps in their own opinion more than he does about road making, when all become bosses, disputes arise and the authority of the supervisor is ignored. He cannot afford to quarrel with his neighbors and constituents, and as we see the result is a continuation of roads forever in want of repairs.

Second, "The taxation of all classes of property for road purposes." That personal property should bear an equal share with real estate in the construction and maintenance of all township roads, is not to be questioned upon any equitable grounds. Real estate owners have no exclusive, or superior rights or privileges on the highways that it should bear all the cost. When out repairing road I have seen bankers, judges, lawyers and "bloated bondholders" driving by with their splendid span of horses and fancy rigs. They have even stopped to complain of the bad condition of our country roads. In such cases I have offered them a shovel, and politely suggested the propriety of their alighting and doing their share of the work, or if they did not like that, I proposed that they might contribute in cash towards having it done. Such parties seldom complain a second time, and never offered the asked for contributions.

Third, "The extension of state aid for the permanent improvement of the roads."

To make the State the initial power of control over all roads within her borders, "and she should not be asked to make investments or place money where she has no control of the same," it would soon throw into the hands of irresponsible leaders a vast political power that would prove dangerous to the integrity of our Commonwealth, and in time possibly wreck our boasted independence.

Remember the political power wielded but a few years ago by the canal commissioners with but one road, or through line from Philadelphia to Pittsburg under their control, and how party supremacy was maintained through the use of its revenues and offices, for the corruption of voters for many years.

With a revenue of seven or eight millions annually of road tax in their hands, any party could and would maintain itself against all comers. Its ramifications and power for evil would be felt in every township in the State with constant danger to the people.

No, the initiatory power over, and control of common roads should be in the county, and even then it would be a big thing, requiring skill with no little executive ability in its management.

That our laws now making townships the unit or starting point in road making and control have been a failure, has long since proven to be a fact. Why has this been the case? I am constrained to believe that it arrives largely from the weakening that comes from a division of force. The annual road tax of Chester county I roughly estimate at one hundred and thirty-six thousand dollars. The amount of force in this sum undivided and judiciously exerted would far exceed that of the same amount divided up as is now the case, amongst sixty-eight townships.

The waste consequent upon such a division of capital would at once be apparent to any one accustomed to large operations in business.

Not only the direct loss in the power of this large sum of money, by division, is to be considered, but the large addition in the cost of management in its disbursement when turned over in dribbles to the one hundred and seventy supervisors of roads of the same county. These supervisors are nearly all men who have had no experience in the management of any considerable force of workmen, and of course seldom secure the best results to be derived from well organized and well directed labor. They have little or no knowledge or skill in what might be called scientific methods of road construction.

Now what we need for the permanent improvement of our public highways, and nothing less will do, is a complete and thorough change from the old do nothing but patch systems, to new methods based upon well established business principles, and a thorough application of all scientific knowledge attainable to the work, with a conservation of money force through concentration of the same.

With an efficient and properly organized force to manage the roads, one-half the road tax now raised and wasted upon repairs by ignorant supervisors and inefficient labor, might be saved and applied to permanent improvements.

In the absence of any better proposition from men who have given this subject more consideration, I would suggest that all of the old road laws be repealed, to be replaced by a general lawmaking the county the initial authority in the construction and repairing of all roads within its borders.

That a commission of say three or not more than five men be elected from different sections of the county to serve for three years, and be known as the board of roads commission, to have charge of laying out, constructing and repairing all roads and bridges. They might have authority to grade, or change location of roads, and even to assess damages, of course under and subject to the supervision of the courts of the county.

Under this board and subject to its orders should be a competent civil engineer learned and experienced in the science of road construction.

The county should then be divided into several, say eight, ten, or twelve convenient road districts, each composed of several contiguous townships. In each district, one competent road supervisor should be appointed to direct and control all labor, under instructions from the engineer in chief.

These supervisors should be furnished, each with all of the best appliances such as stone crushers, road scrapers, other machinery, and

tools for carrying on their work in the cheapest and best possible manner.

Their labor should be employed by the year so that it might become experienced and therefore the more effective.

These supervisors would fill the place of the one hundred and seventy inefficient and costly supervisors now controlling the roads of Chester county at a greatly reduced expense to tax-payers. Twenty experienced laborer under the supervision of able managers, and accustomed to their work, would do as much and better work in a day as three times their number of the inefficient crowd heretofore brought out to pay their road taxes in labor.

A comparatively small force of men would be needed if retained in service the whole year. These men would make road building a permanent occupation. The commissioners would then have a force upon which they could always rely, and would soon be able to calculate with some degree of certainty what amount of money they could safely devote to permanent improvements from year to year. And I have no doubt that the savings from this better organization with the economy likely to ensue will be sufficient to carry on the permanent work proposed quite rapidly without further taxation.

How permanent roads may best be constructed depends very much upon the nature of the grounds over which they run, but this practical work can be safely trusted to the wisdom of skilled engineers with whom the responsibility should rightly rest.

JOSEPH FLOWERS, Bucks county, Pa. *First*, I believe that the present law, which compels the supervisor to notify tax-payers so that they may work out their road-taxes should be repealed, and the taxes be paid in money, thus allowing the supervisors to employ labor where it can be procured to the best advantage.

Second, I most emphatically favor taxing all kinds of property for road purposes, manufacturers, bankers, investors and all who pay but little tax now for local purposes, need and appreciate good roads, as much as those who have the whole burdens to pay, and they really demand more protection from local taxation than do the farmers; it is largely this class who favor the improvement of the roads, knowing full well that under the present laws real estate will have the bills to pay.

Third, With proper restrictions I think the State should extend aid for the permanent improvement of our roads. The farmers under the present revenue laws are already too heavily burdened; so much so that to add to this burden by requiring them to pay for permanent improvements to any considerable extent, would be ruinous to their business. Rather let the state tax be increased upon many classes of property which pay no local taxes, and let the State expend it for permanent improvements of our road.

M. S. COOKE, Chester county. I am quite sure we would have much better roads and at much less cost by having them worked and kept in repair by paying for said work in cash to a set of contractors who should be employed by a general supervisor, who should be kept constantly on hand always ready to arrest a break or wash soon as started, which many times would save the expenditure of ten times as much work or cost; as well as keeping bridges and culverts in a safe condition, and by thus employing reliable parties (having them under bonds) and paying cash, we would be entirely justifiable in insisting on the work being completely done, and I am very sure it can be done more seasonably and lower, as the business now is managed under present laws, it often

happens that good able bodied workmen cannot be had just at the proper time, and supervisors have to employ old men and boys or trifling persons who care only for the money, and to get in the time; or allow the work to lay over until it has increased greatly from renewed rains, or the ground grown so dry and hard as to require often double the work, whereas if looked after by a party who was bound to keep the roads in good condition, he would be ready and prepared in proper time.

In regard to taxing all kinds of property to pay for road repairs and improvements, it seems to me very proper and right that all property should be taxed for said purposes, as most every person travels the roads more or less, and should help pay for keeping them in good order, and again, I am sure the bondholders and heavy capitalists are just as much bound (or should be) as farmers or any other class of citizens, also corporations, banking and syndicates, are all either directly or indirectly interested and should help defray all public expenses, as all classes of business are very greatly dependant upon the agricultures, and as it now stands, we farmers are bearing by far the greater part of said expenses, and are already working under undue discrimination and oppression. Therefore, it appears to me not only just, but really imperative on these richer classes, especially, to pay at least a proportionate part of said tax, even if for their own benefit, if nothing more, knowing that if farmers do not prosper they will suffer more or less.

And as to the State helping to support the public highways, I think it just as important and as necessary for it to help maintain and improve public roads as it is to improve and keep open our navigable waters, which are really public highways for the people, and this they freely do by frequent appropriations and orders to open certain rivers or remove various obstructions in our great waters, either state or natural, as the case may require.

S. W. MORRISON, M. D., Chester county. I am decidedly in favor of new road laws—not revision of the old ones. Of first importance in the new laws, a general state supervision should be provided for, through a state superintendent, with a superintendent in each county, all of whom should be skilled surveyors paid by the State a reasonable salary, say of eight hundred dollars, and an allowance of a certain mileage to cover cost of conveyance to places of work.

These surveyors should have authority to lay before the courts the matter of roads to be vacated and new roads to be opened. Within a few miles of my residence there are more than a dozen instances where the present road goes over the hill and where the hill could be entirely avoided by going around it without increasing the distance materially, and indeed in some cases the distance would be less, and the expense for repairs of these roads around hills is greatly less, and they rarely get badly cut up. The work of making new roads and repairing old ones should be by a supervisor elected as at present, and employing the best laborers obtainable, but under the general instructions of the skilled county superintendent.

I believe in equal taxation on all capital whether invested in land, manufactory, or western mortgages. I see no reason either why telegraphic, telephonic and electric light companies occupying and obstructing our highways should not be taxed specially; let no business carried on in the State for profit escape.

In answer to your third question I think the State might agree to give two thousand dollars per mile for all roads macadamized twenty feet wide according to specification.

W. KENDERDINE, Bucks county. Our road taxes should be made payable in money and not in labor, for the reason that so many able-bodied farmers are too busy with their own work to answer the call of the supervisor when the necessity for mending roads is most imperative. It has been the common practice to delay work upon the roads until the latter part of May, when the last belated farmer has his corn planted, and then a regular township parade is marshaled at a given point, under the command of a supervisor. This medley force of tax workers is made up of all the different phases of humanity, wherein are found the old and the young, the lame and the halt, the submissive and the insubordinate, the solemn wise, and the merry foolish, the honest worker and the guilty shirker all engaged in the pastime of working out their taxes.

At the word of command the sod begins to fly into the middle of the road while the stones are thrown under the fences. This annual proceeding is commonly called road-mending. Why the necessity for these township meetings on the public highway, when a few good laborers would be all-sufficient and much more economical?

It is as unkind as it is unjust to conscript our aged grandfathers, and depopulate our schools of half-grown boys, and expect them to keep our roads in order, while the able-bodied citizens exempt themselves from such duty, for the reason they are too busy with their own work, or because the wages allowed them are not sufficient.

We have out-lived the provisions of our ancient road laws, and the sooner our legislators will give us a new one, arranged in all its details to suit our modernized needs, the better it will be. Give the supervisors full power to collect and expend the taxes as they may direct; release them from being compelled to notify all taxpayers, and then they will select competent workmen to the exclusion of feeble youth and tottering age.

Taxpayers who are able and willing to work out all or a portion of their taxes should be given the preference, but a severe line should be drawn against indifferent workers who seek to impose upon the public.

All properties of equal value should be taxed alike for road purposes, including all real and personal property now taxed by either State or county, so that the burden of taxation will fall upon all without favor or partiality. The fortunate possessors of money bearing interest should be willing to bear their share of the taxes for improvement of roads, as many of them receive their full share of advantages derived from improved highways. A per-capitum tax should be levied upon every citizen voter, the same to be collected as now provided by law relating to road taxes.

There is a general sentiment among men most interested in having our roads permanently macadamized that is favorable to granting aid from the State, differing only as to the best way of attaining the end desired. To apportion such appropriation to the several counties or townships in proportion to the amount of taxes expended for road purposes, or according to the number of miles of roads within a certain district would be difficult and almost impossible.

The only way to avoid the many objections to granting State aid, would be to enact a uniform law applicable to every district alike, that whenever any township shall, through its board of supervisors, agree to expend one tenth of its tax collected or assessed for road purposes, in permanently macadamizing the most needed sections of its roads, (this rule to continue until all necessary roads have received proper atten-

tion) and when said board shall, under oath or affirmation, administered by the presiding Judge of the county, declare they have expended full ten per cent. or more of road tax collected by them, amounting to \$— in permanently macadamizing certain sections of roads within their district, giving a description of the extent and locality of the improvement made by them, then the president of said board shall receive from the clerk of said court a certified copy of said declaration. This copy shall entitle the president of the board of supervisors to draw an equal amount of money from the State Treasurer, to be expended in macadamizing *additional* extent of said roads—provided that no township shall receive more than \$1,000 per year from the State.

A board of supervisors should consist of not less than three nor more than five members; one of them to be elected annually each year. They should, after each election, proceed to organize themselves as a board by electing one of their number as president for the ensuing year. The "town clerk" should act as their secretary, who should keep a record of their proceedings in books provided for the purpose. They should have twelve regular meetings each year. A majority vote of the board shall decide as to the extent of repairs and improvement most necessary, and shall fix upon the amount of expenditure, arrange the hours of labor, adjust wages and assess taxes. Each supervisor to act as overseer of the poor in his district assigned him and shall report to the next meeting of the board the names of persons or families needing assistance, the same to be recorded by the secretary.

If the plan proposed should meet with favor and laws enacted to carry the same into effect, the result will benefit all those townships that choose to avail themselves of the opportunity offered them to gradually macadamize their roads, while the assistance granted them by the State will encourage them to still greater efforts. In no other way can the result desired be attained. By this plan no additional officers are necessary, no boasting contractor, no officious engineer will be needed. The longer term of service given to the supervisor will give them an opportunity to educate themselves up to the necessary requirements until they become efficient. Let us escape if possible any increase of officers, particularly those not elected by the people, for the honest and faithful citizen knows not so much of law as he does of "laws delay and the insolence of office."

JOHN C. BOAL, Westmoreland county. As to the first, I would say that I have always disapproved of the enactment of a law for the entire Commonwealth of Pennsylvania, which would require the payment of road tax in money instead of work.

I have written several articles for the press on the public road question during the past season, and I made my opposition to the passing of such a law a feature of every article.

I believe that the passing of such a law would be a serious blunder, as I think it would be very injurious to many of our citizens.

In an accompanying article, I hope to be able to show that my opposition to such a law is not based on prejudice or mere speculation. As to the taking of all classes of property for road purposes, such arrangement has my hearty approval and would receive my earnest support provided the funds thus raised would be expended in the same locality in which they were produced. I think every township should have the privilege of levying the percentage on property for road purposes within its own precinct. I am sure that such an arrangement would better meet the requirements of the varied conditions in the different localities of our Commonwealth.

As to the extension of State aid for the permanent improvement of township roads, I will say that my approval or disapproval of such an arrangement, would be determined by a knowledge of the source from which the State would propose to replenish her treasury after such disbursement; if such State aid as has been referred to should be secured by requiring farmers to pay additional percentage on their property to what they are already paying, I would not favor such extension, as I think that the matter of raising and expending the farmers' money for road purposes, could be done to suit varying circumstances and conditions better by local officials than it could be by the direct interference or services of the State.

My idea is to let every township rely on its own resources for the improvement and maintenance of its roads. Of course if State aid could be secured for the improvement of township roads without increasing the farmers tax, such aid would be thankfully received. But as we have said, if farmers are to pay for all the improvements on their highways, let the funds for such purpose be raised and expended in the same locality and in amounts adequate to the changing environments and circumstances in the different localities in the Commonwealth.

WILLIAM GATES, Venango county. Under the supervisor law the supervisors are the financial board who levy the tax and have the supervision of all the work done, but they must notify every taxpayer when and where they shall work, and must have sufficient given to work all his or her tax, or collection cannot be enforced. The act of 1844, which was extended to a number of the northern counties, provides for the election of three road commissioners who act as a finance board and have a general supervision of the roads with the further provision that one pathmaster shall be elected for each school district in the township. It is a very common occurrence in the selection of a pathmaster, to select some old worn out man or cripple, and select him through sympathy, who has not a single qualification to direct how roads should be made or repaired. As the pathmaster is elected by the voters, they may obey the orders of the commissioners or not just as they please, and the commissioners have no remedy, except to impeach before the court, under the act of 1844. The tax-payer must be notified of the time and place he shall appear to work his, her or their tax, and be given sufficient time to work all the tax or collection cannot be enforced. The work feature of the road tax is a grand farce. The opposition to a cash road tax comes from the small tax payer who can work his tax in a day or two and save paying the cash, and the town loafer and small boy, who is so worthless that no body wants to employ them, or too weak to do the kind of work required to be done. All they want, is to get on the pay roll. They care nothing about the road and do as little as possible, and nothing right, but the supervisor must keep his temper, and permit the taxpayer to work out his tax. Under such systems it is impossible to get good work done. Our road laws lack force and a strict accountability and good service. There could be a great improvement made in our roads, if the taxpayers would take an interest and see that their tax was honestly and properly expended. Laws will not make roads, it requires hard work and engineering skill. No law can be framed to meet the requirements of every section—where there is much travel and a heavy traffic, a more substantial road with harder material must be used, than where there is but little travel and traffic, and that should be left with the officers in charge to meet the requirements.

1 in 10

1 in 20

1 in 24

1 in 26

1 in 30

1 in 40

1 in 44

1 in 50

1 in 100

Level.

DRAFT AS AFFECTED BY ELEVATION.

There has been an effort made at nearly every session of the Legislature to amend the old or originate a new system to open and keep in repair our public roads. The latest effort has been to establish a county system, but the farther you place improvements from those interested, the less interest they will take, and the more it will cost. The greatest obstacle in the minds of the legislator seems to be that no law can be framed to meet the requirements of all sections of the State. That difficulty is fallacious, laws do not make and keep roads in repair, and if the people of any community are determined to have good roads, they will have them law or no law. The law may say how a road shall be laid, how wide it shall be, what the grade shall be, and may say whether the taxpayer shall pay his tax in money or shall have the privilege to work his tax. But it should not say what kind of material must be used, or that the roads must be uniform in construction, for the reason that the same kind of material is not attainable in every locality, and the travel and traffic varies so much that the road must be constructed to meet the requirements. The township roads in this Commonwealth are being improved every year under our present system. They are much better than formerly, notwithstanding the weakness of the system.

Our roads are generally turnpikes and drained by sewers and streams bridged and all made as evenly on the surface as the locality will permit, and when the moisture is not in excess, we now have good roads. Repeal the work privilege of the tax payer, and place the roads in the hands of three supervisors or commissioners, collect a sufficient tax in money and pay it over to township treasurer, to be drawn by warrant by town clerk and supervisors, for the wages of the men employed by them, and the purchase of material and necessary machinery to successfully work the roads and keep them in repair. Where the county system prevails the roads are under the control of the county commissioners, and it takes away all local interest in the roads; appropriations are made in a stringent manner, and the money lost on salaries of superintendents that do not work.

LEONARD RHONE, Centre county. The farmers throughout the State feel that the construction of public roads should be left to the people of their respective townships, believing that they have a sufficient interest in their several townships to construct such roads as may suit their circumstances, and meet the requirements of the public, and that no matter what system of road making is adopted in a republic like ours, it must be left to the good judgment of the people in their sovereign capacity to elect their supervisors. The payment of road tax in money instead of work, in their estimation, is simply a scheme of a contract system whereby a few contractors may enrich themselves at the public expense, and a reflection upon the honesty and integrity of the farmers doing an honest days work. The amount and value of work under any system must depend largely upon the managers of the roads. The taxation of all kinds of property for road purposes is but a just claim, as public roads are but avenues for all kinds of business, and feeders to the great railway transportation system of the country, therefore the farmers justly demand that all classes of personal, corporate and mercantile property shall contribute an even handed share with the real estate. Our farmers as a rule are opposed to too much fraternalism on the part of the State government, and see no necessity for State aid if justly allowed to tax all kinds of property and occupations equitably and equally for township and county purposes.

For the State to assume control of the public roads would be only to fasten upon the people an expensive road system without any voice in their control, and would in many cases prove a great hardship by delay in the roundabout way in getting redress of a proper construction of roads.

G. G. GROFF, Union county. 1. At first thought, it would appear better to pay the road tax in money, rather than in work, but I am not sure that it is so. The farmers have much time during the year when they can profitably work on the roads and I do not think that they ought to be deprived of this privilege. I think that the trouble at this point arises from the general inefficiency of the Supervisors. If proper men for this purpose could be secured, those who understood how to repair road, send to drive gang of men at work, I think this question would not arise. Ought we not to have institutes on road-mending, and then elect those only to the position of supervisor who had certificates of proficiency? It seems to me that there would be no difficulty in securing the proper men to conduct such institutes, and I believe that enough of our young men would attend courses of instruction to give us all the supervisors needed. Legislation would be needed on this point, but has not the present supervisor nuisance continued long enough to cause us to welcome even a new law?

2. Certainly; I would tax everything I could lay hands upon. Stocks, bonds, judgments, notes, personal and real estate, occupations, canals, railroads, telegraph wires and poles. Everything, and not one alone should pay the road tax.

3. Yes; the State should aid in the permanent improvement of *all* the main roads, though I think not of the byroads. The main roads are those between county seats, important towns, and the main lines of travel. The towns and cities are benefited by good roads, they cheapen produce to the consumer, increase trade, are used by the citizens of towns, exist for all the people, and hence should be supported by the State government. I would not hesitate to turn the main roads over entirely to the State. This would be proper and just.

I think we need, first of all, to secure better and cheaper roads, intelligent supervision. There ought to be in each county, for a few years at least, an educated engineer, who might be designated the county road commissioner. He should be paid by the State as the Superintendent of Public Instruction, in the counties are paid, and should be appointed by the orphans' or other court from a list of qualified persons.

The duties of this Road Commissioner would be:

1. To hold institutes twice a year for instructing in proper road-making and repairing.
2. To examine candidates for the position of supervisor, and to grant certificates to those qualified for the position, and no others should be eligible for the office.
3. To pass from township to township while repairs were in progress, and to aid the supervisors by helpful hints in reference to the work or the management of the men.
4. To examine the roads of the county in reference to securing better locations, to abandoning unnecessary roads, or to opening new ones.
5. To attend conventions of road commissioners to learn of all new methods and new machinery.
6. To see that rail and private roads do not injure or in any way impair the "public roads." We have roads improperly located. In some cases

they pass through swamps which can easily be avoided. They pass over hills, when a better road can be made around the hill. They cut farms badly when a little re-arrangement would avoid this. In some places there exist too many roads. I have in mind one farm in Chester county which has nearly two miles of public road used only by that farm, when a new road can be tapped by a lane one-fourth of a mile long. In this case, there is no need of any public road at all, or at least of no expense to the public, and yet the two miles of unnecessary road are maintained. I have in mind another place where no less than four public roads existed, running parallel to each other within a distance, I think no greater than one and one-fourth miles. Very properly, two of them have been closed in recent years. I could give other illustrations, but these will suffice.

Roads should be classified, I would suggest, (1) Turnpikes and railroads owned by private corporations. (2) Main thoroughfares in charge of the State. (3) Secondary roads, repaired by the township, but under the county commissioner. (4) Private roads, kept in repair by those benefitted, not under State or township. (5) Foot paths, public passages for pedestrians across mountains, meadows, &c., but not repaired.

There is one other suggestion I wish to make. I think that it is practical and proper to use almost all of the prisoners in our penitentiaries and county jails, in the permanent improvement of our public roads. The county could use its prisoners on county roads, and the State could employ those committed to its care on State roads. These prisoners could perform work which would not otherwise be performed, that is, improve the roads faster than could be done by taxation. To the ordinary prisoners should be added the army of tramps, and I would also suggest, the great army of weakminded, or partially idiotic persons now confined in our State lunatic asylums. These persons are now confined in enforced idleness, at great expense to the State, while they are capable of manual labor, and would be much better off if they had a chance to perform it. The question might be asked why the county road commissioner need have any oversight over railroads and private turnpikes? The answer is, men in county places, the people, have at present no one to protect their roads from great corporations. The court may do something after damage has been done, but even then the remedy is too often valueless against corporations which furnish free passes. I will give one illustration to the need of supervision. Before the Reading railroad passed through Union county, we had above and below Lewisburg in all some six miles of as good and beautiful road as existed in the State. This the railroad destroyed, and we received absolutely nothing in return, except a road too dangerous to use, and the county will have to build a new road. A competent commissioner would have saved this county thousands of dollars in this one transaction.

A. P. YOUNG, Columbia county. Should road tax be paid in cash? There was perhaps a time in the early settlement of the country when it was the better way for each man to work out his road tax. The old custom still holds, not because it is the best way now, but rather because it is the old way and we haven't got out of it. We are in the rut, and an effort is needed to get out, that is all.

In the township in which I live there was spent last year about \$2,000 in work on the roads—repairs—not a rod of road made that may not need repairing again this year. The weather has been exceedingly

favorable for making mortar of the clay, soil and washings put into the road, as well as for working up mud-holes and getting the mortar worked off again into the side drains. The roads are no better, perhaps worse, all things considered, than they were before the \$2,000 were expended on them. We certainly have got very poor returns for this money. Half of it spent on the worst places, the other half invested in permanent road bed somewhere, where there may happen to be a mile or two of road properly located, and there would be something left for the money spent, now, it is simply sunk in the mud.

The mile of good road which might have been made, would have been a beginning, the addition of another section this year and another next, would in time make all good, then a small sum only would be needed for repairs. An entire change in the methods of road making and repairing is certainly urgently needed. A necessary preliminary step toward improvement seems to be to get the tax levied for road purposes paid in cash. We have plenty of men who would engage to keep the roads in as good repair as they are kept now for half the money in cash.

There is then great waste somewhere evidently. This may occur in many ways; wrong time of doing the work: work not properly directed; men working to get the tax out rather than to repair the road, and so on to the end, of the ways there are to get away with the tax and leave no adequate return.

The taxation of all property, according to value, for all purposes for which tax is levied is so manifestly just and right, and the people are getting so thoroughly aroused to the injustice of the present system, that redress of grievance in this direction certainly cannot be much longer delayed.

All are interested in the roads. The citizen of city and village have as much interest in having country products taken out as he of the country is. What would be the value of a fertile farm or a healthful and picturesque town site located on the top of an inaccessible cliff? Village and town property is now valued at much less in proportion to actual market value than are farms. This condition has been brought about by advance in value of town property and decrease in value of farms. The reason of this is obvious, many farm products have shrunk one hundred per cent. and some even more in a few years, while the wages of workmen have been kept up and are even now on the advance. This accounts for deserted farms and crowded towns and cities.

In this matter of taxation let all property be listed real, personal, and mixed, at actual market value, then let all bear an equal share of the cost of government, of the cost of roads, of schools and of caring for the poor and unfortunate. This is justice to all interests.

As to the question of "extending State aid for the permanent improvement of township roads." It may be practicable, but it seems to be injudicious. The revenues are derived from the people, and until the time arrives that we have no State tax to pay—if indeed that time is coming—why send money up to the State treasury and have it returned again for distribution among the same people from whom it was originally collected?

It looks very much like providing for a multiplication of percentages and salaries for unnecessary care taken. Salaries and men to draw them are much too numerous now. It would seem that the chief business of some of our legislators is to find an excuse for increasing somebody's salary, or to create a new office for some friend to fill.

Much might be saved to the people—without detriment to the public service—for use in improving roads, &c., by properly adjusting the salaries of officials. County commissioners, sheriffs, registers, prothonotaries, and other officials receive salaries or per diem enough to make it so much of an object to get the office, that frequently candidates are willing to spend more than the income of a good farm, for several years, to get the position. A proper adjustment of these salaries and perquisites would go a long way toward ridding our county seats of the incubus of professional office seekers.

From the foregoing and other reasons, I draw these conclusions and answer to your questions.

First. To improve the roads let us have a new departure. Pay the tax in cash. On half the levy of each year to be spent in permanent improvement, first grading the roads for said improvement, either by cutting down and filling, or re-locating, so as to get the best attainable grade between points to be connected; this is important, permanent roads are for all time, not for this year only, and the maximum load that can be taken over a given road is measured by the amount that can be taken over the hardest place.

Second. Let all classes of property be taxed for road purposes.

Third. As to State aid let us try equalization of taxation, then so arrange that State revenue, meet State expenses and avoid far as possible sending up funds to be returned.

HENRY OMWAKE, Franklin county. In this county the supervisors are not bound to allow persons to work out their road tax, but may compel them to pay in money. Though it is tax-payers and farm hands, mainly, that are employed to mend the roads, because these are often the only aid that can be secured at the needed moment,

No doubt that system which could support a regular corps of road makers, who in the constant use of the tools would give them a more skillful handling would be better than working out the taxes, yet in either case the efficiency will be determined largely by the competency of the supervision. A provision in the law giving the tax-payer the option to work out his tax should compel him to work when his services are needed, lest the roads suffer for want of attention. In this county where the position of supervisor has been filled by competency there, has not been cause for much complaint, indeed under the present economy, the complaint of bad roads, which is being heralded over the land, is not started by the farmers who are the chief users of roads and who pay for keeping them up.

So long as land owners must furnish all the means for road improvement they should be invested with the right of control. The people may err in the choice of a supervisor, but they will correct the error at the next annual election. A reduction in wages of supervisors from \$2 to \$1.50 would have a good effect, such reduction would amount to over \$200 in this (Antrim) township, and in the county would exceed \$2,000. In other respects the present law is democratic and gives all the latitude for taxation farmers are able and willing to bear. To insure better roads means more money, and were every species of property equally taxed for road purposes, as it should be, improvements could be vastly extended.

The last year has been extremely wet, and as a result the roads have been muddy, as earth or clay roads will be in rainy weather. If our taxes were judiciously spent in putting well broken stone on the road in this county which is nearly all of limestone formation, we would,

instead of mud holes, soon have a solid roadbed. Roads uniformly macadamized, though desirable, would involve such expenditure of money as the land owners of the county are unable to support. \$200,000 would hardly pay for putting one-fourth of our roads under turnpike, which, with the present burden of school, county and State taxes, and with wheat at seventy-two cents, would be an impracticable undertaking.

It has been suggested, and with reason, that the State should aid in effecting certain permanent improvements by macadamizing certain leading highways. There is room for such improvement in this section, and the material is abundant. If the State can devise a plan and provide the means for having it prepared and put on the road, without a burdensome increase of taxes to the farmers, it would no doubt be a commendable advance in the right direction. Whilst any law with such compulsory provisions as would vastly increase the burden of taxes to the land owner would not be in keeping with the agricultural depression of the times.

To insure a judicious outlay of funds in constructing and improving road-beds, requires competent supervision on the spot. Therefore the number of supervisors could not be lessened with good effect. No matter what the law is, the roads will partake largely of the character of the supervision. If the supervisor's methods are unbusiness like and unseasonable, the money, except the usual one-fourth which is drawn as salary, will be spent for naught. Too much time is frittered away in supervision which is no supervision, and too much labor wasted in temporizing by supplying the road bed with earth instead of solid material. Water drains are made by a sharp ridge of earth and broken stone placed diagonally in form like a half section of a log two feet in diameter, and are called breakers because they are so effectual in breaking carriage springs.

JOHN C. WENNER, Luzerne county. *First.* The people in my immediate vicinity, in close proximity, are decidedly opposed to cash road tax. This is the prevailing sentiment so far as I can learn. The prevailing cause is the uniform depreciation of real estate and farm product values. It imposes additional money taxes to the already over burdened tax-payers.

Second. In the event the proposed road schemes are enacted into laws, by all means tax all species and classes of remunerative property for road purposes.

Third. The State should extend State aid for township roads for permanent improvements, since our public highways are indispensable for the public roads, and as much used by all classes, as well by suburban as by rural populations. Before the railroad era, farmers transported their products to market over long and rough roads, and now have railroad and market facilities and many other advantages not heretofore enjoyed. The permanent improvements of our country highways is of more importance to all other classes than to the farmers, hence the State should freely extend State aid.

COUNTRY ROADS.

THEIR RELATIONS TO OTHER LINES OF COMMUNICATION AND TO THE STATE—HOW TO MAKE AND MAINTAIN THEM.

By LEWIS M. HAUPT, A. M., C. E., *Professor of Civil Engineering, University of Pennsylvania.*

GENERAL REMARKS.

Although volumes have been written on this subject, and everyone is presumed to know more or less about it, the present condition of the roads of this country is such as to warrant continuous agitation, until the people, who alone possess the power to apply the remedy, shall realize that their own interests will be best served by enforcing a radical improvement in their condition.

It is safe to say that of all the various systems of inter-communication by land or water, there is none more important, more wasteful, more expensive or more susceptible of improvement than our public highways, and yet this enormous waste which is a real tax upon all classes of citizens has been allowed to exist mainly through ignorance, but partially, also, from the fear that the lighter tax necessary to effect its removal may not be intelligently applied. It can hardly be otherwise under our existing laws and modes of administration.

Another strong reason for its existence is found in the fact that the individual is impotent to effect a change of so great magnitude, and that concerted action of masses of citizens is difficult to obtain in public matters. But an intelligent constituency is awakening to the importance of removing this false economy and *laissez faire* policy, and by united appeals to our legislators, substituting an active and energetic reform.

THE ECONOMIC PROBLEM.

Engineering is nothing if not economic. In the location and construction of ways of communication it is to find the line of least resistance and of least cost, both to build and maintain, but especially the latter.

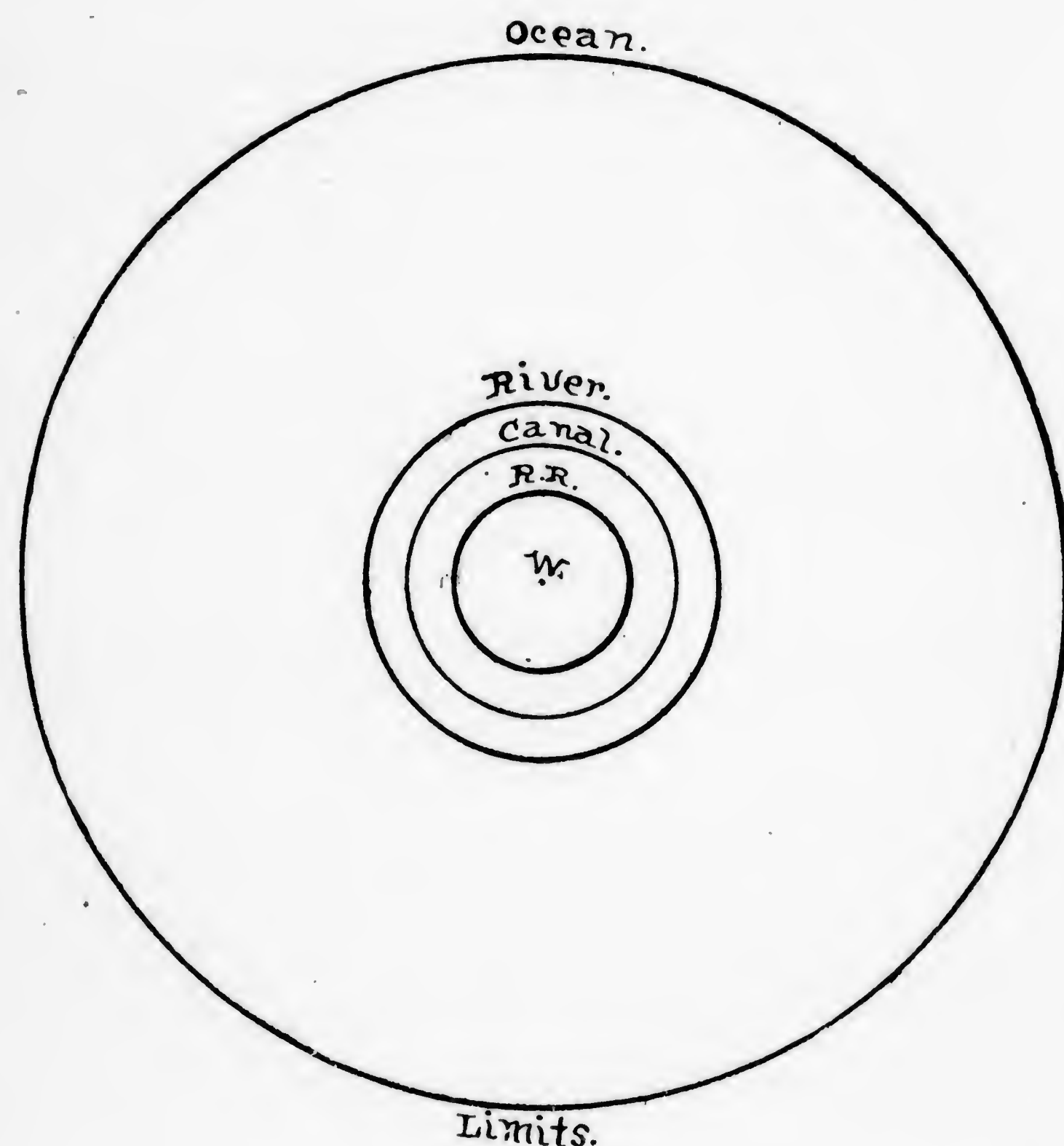
The relative measures of the numerous resistances to be overcome may well be summed up, practically, by the cost of moving any unit of load, say one ton, over a unit of distance, say one mile, known as the "ton-mile." A comparison of these costs or tariffs will reveal some interesting if not surprising results as to the value of the resistances to traffic by common roads, railroads, canals, rivers or lakes, and on the broad ocean. To exhibit them more fully they are arranged in tabular form and are also plotted graphically to scale. The rates taken are from current schedules for freights in bulk with a first-class equipment. They are as follows:

Table showing the relative economy of movement of freight based upon the cost per ton, per mile, by various systems.

THE WAY.	Cost in mills.	Relative rates.	Relative distances.	Relative areas.
By wagon,	150	200	1	1
By railroad,	5	6.6	50	900
By canal,	3	4	50	2,500
By river or lake,	2.5	3.3	60	3,600
By ocean,75	1	200	40,000

Taking the ocean rate as a unit of comparison, it is seen that the cost of movement by rail is 6.6, while by wagon it is 200 times as great (column 3). If, however, the wagon ratio be assumed as the unit, then it will appear from column 4 that the ton may be carried 30 miles by rail to one by common road, or 50 by canal, etc., and if the point of distribution were in the center of a circle having equal facilities in all directions the relative tributary areas would be given in the fifth column. These results are perhaps made more impressive by the accompanying diagram in which the wagon area is the small dot or point in the center, whose radius is taken at one unit. The others are platted from column four.

Fig. 1.



It will be seen from the third column that at these rates the cost of movement by wagon is 200 times that by large ships, and about 30 times that by freight cars. In short, before the farmer can avail himself of any of these cheaper lines of travel for his produce he must pay a heavy tax in overcoming the great resistances between the barn and the station. The trouble does not lie with the railroads which are forced to use every effort to reduce the cost in order to restrain the traffic. It is with the road and it requires no second thought to see that these two systems are intimately connected and mutually dependent. If the roads were in such good condition as to be available at all seasons there would not be so great variations in rates and less danger of an excess of freights at one time with a deficiency at another. The rolling stock could be employed to better advantage and the freight be handled more cheaply while the farmer could take advantage of better prices and avoid a glut on the market.

These are but a few of the incidental benefits resulting from improved roads as feeders to railroads, and they serve to show that it is to the interest of the latter companies as well as of the farmer to improve the roads. They would then become most important "feeders," serving to stimulate population, production and wealth with its consequent traffic.

RELATION TO THE STATE.

These figures have also a direct bearing upon the politico-economic problem as it affects the prosperity of the state or nation.

It will be seen that the railroad rates render nine hundred acres available as food sources to our busy manufacturing centers as compared with one acre at the wagon rate of tariff. Canals, if built of proper size and well maintained and operated would still further increase this theoretic area nearly threefold more, or two thousand five hundred times.* Hence the great value of waterways and the inestimable benefits conferred by the Erie canal, not only on New York city and state, but on the nation. Suppose, however, the rate by wagon could be reduced by the improvement of the roads, to say five cents per "ton mile," what would the result be? It would put in motion a large tonnage of the baser sort that cannot now be handled at any price, it would give a large margin for profit on many products which are now moved at a loss and would directly benefit both the producer and consumer. In 1887 the railways of the United States carried over five hundred and fifty-seven millions of tons of freight. Most, if not all of this, had to be handled at one or both of the terminals in wagons. If the average distance hauled was but one mile and the saving in the cost of the movement were ten cents, the annual economy would amount to \$55,200,000. That the cost of hauling may be very greatly reduced will be seen when we come to consider the resistance offered by grades, surface and distance all of which are involved in the engineering problem.

Since roads are, or should be public highways it is evident that so far as practicable they should be under intelligent public supervision and be regulated by a systematic management vested in local officers under state laws. The trunk lines, of which few are now required, should be more immediately under the control of the state. The main lines connecting populous centers and not forming links in a trunk line, under

* See also a paper by the author on *Canals and their Economic relation to Transportation*, published by the American Economic Association, Johns Hopkins University, Baltimore, Md.

county supervision and the local roads under township control. The cost of construction and maintenance should by no means be limited to rural districts—but all parties interested and benefited, should be required to contribute their quota to this road fund. As has been shown this includes the railroads and the cities for improved roads would soon result in lowering the price of raw material for the benefit of manufacturers and others.

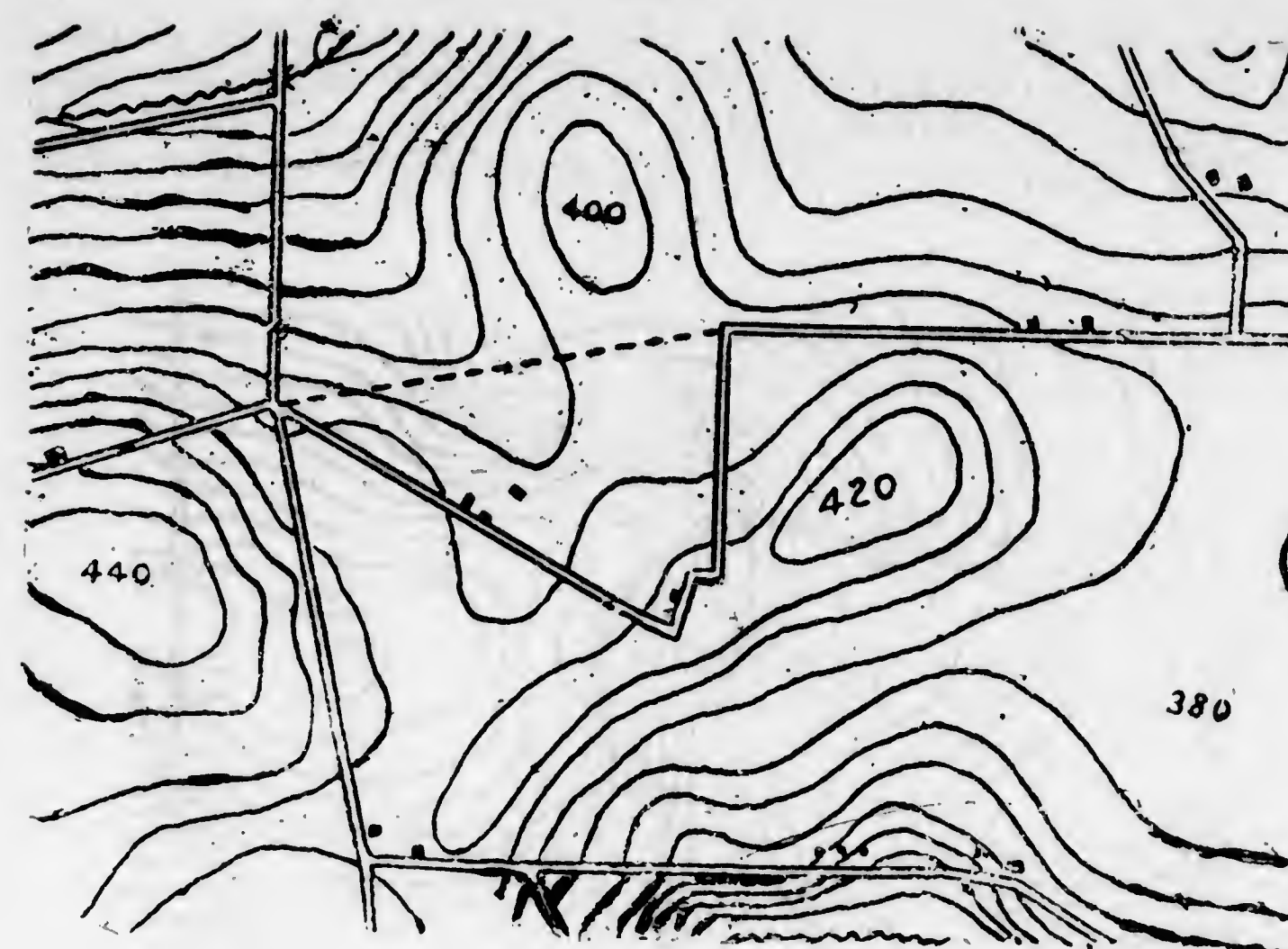
The present method of requiring the township to maintain the roads within its borders in some instances works an injustice. For example, it sometimes happens that a road skirts a river on one side and is cut off from use to the people of its township on the other, by steep and high mountains, so that the residents cannot reach it, yet they must maintain it for the benefit of others, without compensation. Again many counties are required to maintain miles of roads which are not only of no benefit but an absolute obstruction to travel due to their very defective location, some being too straight, others too crooked. By being too straight, is meant those roads which do not turn aside for hills or valleys, but require the load to be dragged up and down at great loss of power and time. If on such a road but half an ordinary load may be hauled, it would evidently require two trips to convey the load from end to end and the effect is the same as if the road were of double the length. The same objections apply to the road which is too crooked, requiring an excessive cost for maintenance and a waste of land which could be rendered productive by cultivation, instead of being a tax. These few considerations it is hoped will be sufficient to show that the problem is not the simple one of digging two ditches and throwing the earth into the berm between them, which anyone may do, but one requiring a careful adjustment of the grades and lines to the topography in such a manner as to give the least resistance and the shortest line for the least money. It is in short

A COMPLICATED ENGINEERING PROBLEM

which should be thoughtfully considered before many of the very objectionable obstructions now existing are permanently fixed by a metalled road. This can best be done, and should by all means be provided for, in the proposed revision of the law by requiring a thorough survey and re-adjustment of the location of the road in each township, not only with reference to topography, drainage, local and personal requirements, but also with reference to their relation to the general system of county and state roads by a competent engineering commission.

A few instances may serve better to show the great importance and utility of such revision. Fig. 2 illustrates a location where a straight

Fig. 2.

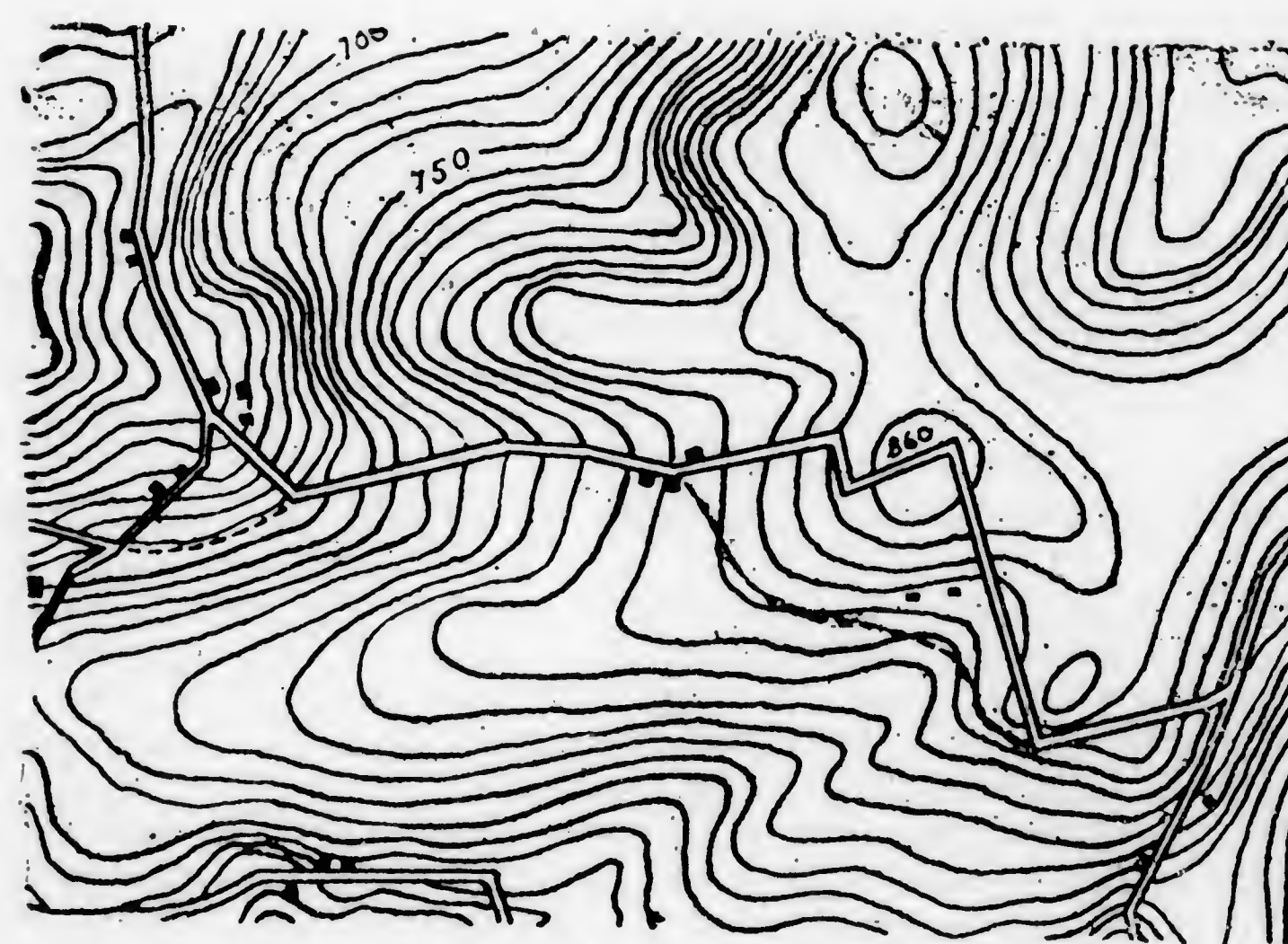


Revised line-----

line, as dotted, would give better grades and at the same time would save the eighty per cent. excess of distance over the bee line, thus rendering that much more land available for farming.

Fig. 3 is a case where the road is made longer than it need to have

Fig. 3.

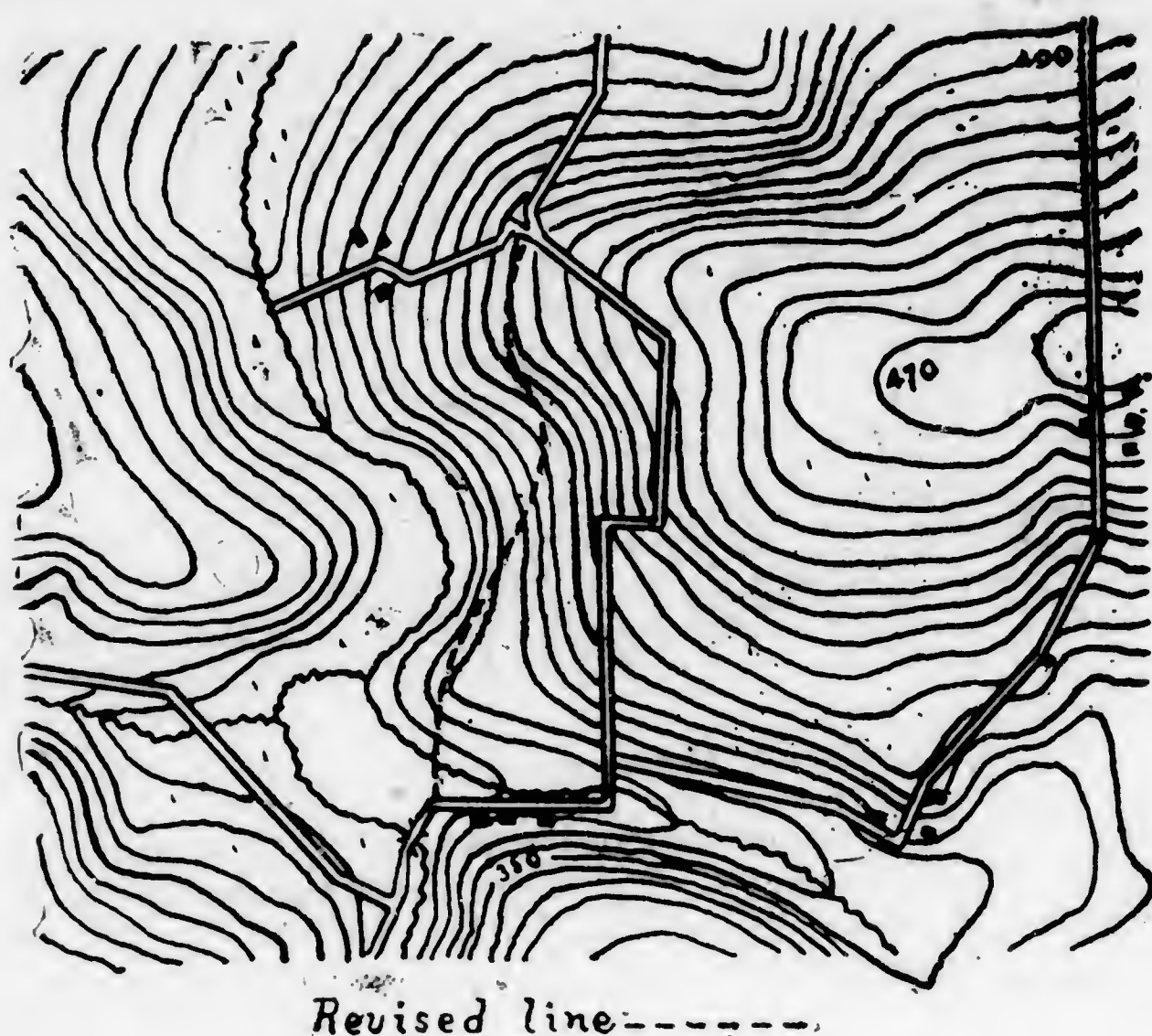


Revised line-----

been, apparently only to obtain a view from the top of the hill, instead of following the slopes at a much easier grade and less distance. It also shows how a level line of a few hundred feet would save ascending and descending a hill fifty feet high.

Fig. 4 is a similar case of going out of the way to ascend a hill only

Fig. 4.



to descend again without compensation.

These are but a few of the very many instances where a much better location can be obtained for less money than upon the old lines. It is firmly believed that the mere saving in cost of construction would more than pay for the cost of surveys and revision. Were the entire state so carefully projected as is the South Mountain District on the topographical maps of the Second Geological Survey, it would be a comparatively inexpensive and simple matter to make the revision, for the topography must furnish the key to the solution. In the above figures the level or "contour" lines represent elevations ten feet apart, and the horizontal scale is 400 feet to one inch.

The entire problem may be conveniently divided into these several parts.

1. The *location*, involving a knowledge of the principles of mathematics as applied to the adjustment of the line to the topography in such a manner as to require the least work in construction, consistent with the shortest distance, best grades, suitable material and requirements of traffic with the least damage to property.

2. The *construction* requiring a careful consideration of the relation of the load to the resistance offered by various soils under different conditions; the physical properties of the materials available; their proper sizes, forms, distribution and adaptation to the purpose, and, above all, special attention to a thorough system of drainage for both surface and sub-soil waters.

3. The *operation* comprising the relation of the power to the resist-

ances, as measured by the cost of movement over various kinds of surfaces; the hardness and smoothness of the wearing surface; the mechanical resistances; the grades and other requirements.

4. The *maintenance* as affected by traffic, character and cost of material, methods of preparing and applying same, character of supervision, etc.

These constitute the scientific, physical and mechanical features of the problem. On the other hand, and quite as important, there are the legal legislative, financial and social elements.

Intricate as the question is it can hardly be more complicated in Pennsylvania than it was about a century ago in England where the results, as seen to-day, are evidence that it is capable of a satisfactory solution.

Hence, much may be learned from the experience of Metcalf, McAdam, Telford, MacNeil, Law, Parnell and others, and from the parliamentary enactments which placed the problem in the hands of commissioners with a competent engineer backed by large appropriations, made available when the inhabitants of a district, desiring road improvements, would subscribe an equal amount or one-half the estimated cost of the road. In those days there were many warm controversies between the advocates of the several systems, and their good and bad points were frequently explained to special commissions, but the two systems which survived the contest were those of McAdam and Telford. The latter, however, would appear to be based upon the much older plans of the French engineer, Tresaguet, who built many miles of his roads in the latter part of the last century.

A brief description of these systems, showing their differences and resemblances would seem to be required. It will be given as nearly as possible in the language of the inventors.

Tresaguet's method, as described by himself in 1764 and as generally adopted in France in 1775, is as follows.* See figure 5:



Fig. 5.—Tresaguet System.

"The bottom of the foundation is to be parallel to the surface of the road. The first bed on the foundation is to be placed on edge and not on the flat in the form of a rough pavement and consolidated by beating with a large hammer, but it is unnecessary that the stones should be even one with another. The second bed is to be equally arranged by hand, layer by layer, and beaten and broken coarsely with a large hammer so that the stones may wedge together and no empty space may remain. The last bed three (3) inches in thickness is to be broken to about the size of a nut, with a small hammer on one side, on a sort of anvil, and thrown upon the road with a shovel to form the curved surface. Great attention must be given to choose the hardest stone for the

*Page 5. "The Maintenance of Macadamized Roads, by Thomas Codrington, London. E. & F. N. Spoon, London, 1879. New York.

last bed, even if one is obliged to go to more distant quarries than those which furnish the stone for the body of the road; the solidity of the road depending on this latter bed, one cannot be so scrupulous as to the quality of the materials which are to be used for it."

THE TELFORD ROAD.

In his first report on the great Holyhead Road, May, 1824, Telford describes his method of construction in these words:

"The foundation is a regular close pavement of stones carefully set by hand, and varying in height from eight to six inches, to suit the curvature of the road. The stones are all set on edge, but with the flat one (edge) lowest, so that each shall rest perfectly firm. The interstices are then pinned with small stones; and care is taken that no stone shall be broader than four or five inches, as the upper stratum does not bind upon them so well when they much exceed that breadth. The pavement thus constructed is quite firm and immovable, and forms a complete separation between the top stratum of broken stones and the retentive soil below."

But Telford did not always require a stone pavement for bottoming. In many cases he merely applied whatever material was most available for producing a dry subsoil. He says: "Particular attention should be paid either to find a naturally dry bottom for the roadway or to construct one; and avoid as much as possible suffering the workable materials coming into contact with the clay. And this may always be accomplished by means of gravel, sand, vegetable soil, chalk, or bottoming stone, but this bottoming should be made perfectly firm and regular, so as to receive the top workable metal of equal thickness."

McAdam went so far as to consider a bottoming of large stones not only useless, but injurious. Experience has proven that such a bottom when not wedged in place, but thrown loosely on an undrained soil, will work up to the surface. He preferred a metalling sufficiently thick to form a compact, dry covering impenetrable to rain and believed that the entire load was carried by the subsoil. This is the chief point of difference between those two systems.

Telford made the bed of the road level in cross section and formed the crowning, by making the bottoming stones as well as the metal covering of greater thickness in the center, diminishing towards the sides. But as this required a careful selection of material and made the metal wear more rapidly on the sides, it was not found to be so good in practice as "crowning" the earthy bed of the foundation and making the metalled surface of equal depth throughout.

For a thirty-foot road the side slopes were six inches for the half width, the section being a flat oval or ellipse. When no paved bottoming was used the convexity was given partly in the gravel bottom, which was seven inches deep in the center and only two at the sides, and partly on the top metalling of broken flint and large gravel, which varied from eight inches in the middle to four at the sides, with one and one-half inches of binding gravel over all this, giving nine inches of convexity in the thirty feet width.

For a section of the Telford road, with pitched bottoming see Fig. 6.



Fig. 6.—Telford's System.

The difference in cost of construction of these two systems will not differ greatly under the same conditions, since the increased cost of breaking the stones for the McAdam road will be offset by the additional cost of placing and wedging the paved bottoming of Telford's foundation.

What the actual cost of these roads would be, must depend upon the accessibility and cost of material and labor in any district, which will be quite variable, but as a guide to an approximate estimate, the experience of foreign countries may be taken as a basis.

COST OF STONE ROADS.

In the north of Scotland on the highlands, where stone is abundant, Telford built 875 miles of road at a cost of £450,000. This total includes several large stone bridges and gives an average price of \$2,570 per mile, but it is believed that the actual cost of the roads alone was less than £400 (\$2,000) per mile.

In the Inverness district of Scotland fourteen and one-fourth miles were built for £4,630, an average of about \$1,500 per mile, again fifteen and one-third miles cost £7,605 or about \$2,500, so that it will be a fair average to place the cost at \$2,000 per mile for these roads where stone is readily available.

The relative cost per lineal yard of Telford and McAdam roads as testified to by Mr. W. A. Provis, assistant engineer to Mr. Telford, is as follows: For a road sixteen feet wide, if stone is to be quarried and carted, say one-fourth of a mile. The section being for the Telford bottoming, seven inches thick at center, five on the sides, with six inches surface covering throughout, the McAdam having a uniform depth of ten inches:

Telford—13 inches thick.		McAdam—10 inches thick.	
Quarrying 1½ cub. yds. measured		Quarrying and carting ½ of the 1½	
on the road at 40 cts.,	\$0 70	cub. yds. of stone,	\$0 76
Carting same at 12 cts.,	21	Breaking 10 inches in depth, or 1½	
Setting the bottom,	40	yds. at 36,	54
Breaking the top 6 inches ½ yds.,	32		
	\$1 27		\$1 30

If there are plenty of loose stones lying around which may be used for the purpose the relative costs may be reduced to fifty-seven and sixty-one cents respectively per lineal yard. Showing that the first cost does not differ materially, but it is claimed by the advocates of the Telford system that one-third the cost of maintenance is saved by the pitched bottoming. At these several prices the cost per mile for a road sixteen feet wide would be \$2,235.20 for Telford, and \$2,288 for McAdam, where material has to be quarried, or \$1,003.20 and \$1,073.64 respectively, where loose and suitable stone is abundant. Thus the price will be found to vary according to the character and distribution of the materials.

A road of the above width will be sufficient for two hay wagons to pass and will readily accommodate two lines of traffic, but for lines ap-

proaching populous cities or connecting important centers the width should be increased up to that for the roadway of city streets, the most economical width of which for a large traffic is four rods.* At the same ratio every additional foot of width will add one-sixteenth to the cost, hence it is important to determine the amount of traffic and to make the road sufficiently wide to provide for it, leaving room for future expansion if need be. On all highways there should be, if practicable, space in which to pass or to turn around.

THE McADAM ROAD.

Probably the best idea of this very general method of construction can be given most briefly by a reference to Fig. 7, and a few extracts



Fig. 7—McAdam's System.

from McAdam's testimony before a parliamentary commission in 1819. In reply to the inquiries of the chairman he said he had about one hundred and eighty miles of road under his care in the Bristol district where he then lived, but he had acted as commissioner for various roads for about twenty-five years. He went to England from America in the year 1783 when roads were making in Scotland and found them very bad there as well as all over the Kingdom. He said, "The defects of the roads appear to proceed principally from the large use of a mixture of clay and chalk and other matters that imbibe water and are affected by frost." * * I have always found tolls most moderate where the roads are best managed. * * The best roads are due to the attention paid to the preparation of the materials and the manner of laying them. * * "I have generally made roads three (3) inches higher in the center than at the sides when they are eighteen feet wide; if the road be smooth and well made the water will run off very easily. * * I should think that ten (10) inches depth of solid materials well consolidated is equal to carry anything whether the substratum was soft or hard; I should rather prefer a soft to a hard one." * * "In forming a road I never use large stones on the bottom of the road; I would not put a large stone in any part of it. The size of the stones should not exceed six ounces in weight. I hold six ounces to be the maximum size. If you make the road of all six-ounce stones it would be a rough road; but it is impossible but that the greater part of the stones must be under that size."† "The state of disrepair and the amount of expense varies in a pretty exact proportion to the size of the material used." * * "The stone is employed to form a secure, smooth, water-tight flooring. * * "Its thickness should be regulated only by the quantity of material necessary to form such a flooring and not by any consideration as to its own independent power of bearing weight."

* See Best Arrangement of City Streets, Franklin Inst. Journal.

† Such a stone would be about $1\frac{3}{4}$ to $1\frac{1}{2}$ inches cube.

Thus it will be seen that McAdam believed the function of the metal was to form an impervious, hard, wearing surface while the load was carried entirely by the subsoil. He insisted rigidly upon limiting the sizes of the broken stone by weight to six ounces and required the supervisors to carry scales and test the material constantly. Also that they should be scrupulously clean and free from dust and preferred to lay them in three or more layers at different times and if possible in wet or foggy weather.

EARTH ROADS.

Under certain conditions, and with some soils, earth roads are sufficiently good for light traffic, but unfortunately they do not possess the important properties of hardness, smoothness nor permanency; are readily affected by frost and water, and difficult to keep in even passable condition.

Yet with a knowledge of the most important requirements and careful attention to their fulfilment, earth roads may be greatly improved. These requirements are, first, thorough drainage, and, second, an impervious surface wherever it can be obtained at reasonable expense.

The first may be secured in many places by revising their location so as to take the roads out of the bogs and swamps, and put them on gently undulating grounds where there is sufficient slope to carry off the water, yet not so steep as to produce a wash. Also, by raising the bed a few feet above the general level of the surrounding land, and providing suitable drains at frequent intervals, having grades of not less than 1 in 125. The cross section should not be "rounded up" from deep ditches on the side as is the custom, but each half should be made nearly flat, having a side slope of about 1 in 20 each way sufficient to carry off the rain, and, if on the road-side of the fences, the side drains should be covered. In regard to the surface, it is not generally known how by combining certain soils in proper proportions an impervious covering can be made. It is commonly recommended to improve an adhesive clay by a surface of six inches of sand, or the reverse, thus neutralizing the prominent characteristics of each, but if the following proportions be observed a good "puddle" material will be produced, which is impervious to water. In preparing puddling for dams and reservoirs it is found that "gravel" with due admixtures of fine materials make the very best embankment to retain water, even under fifty or more feet head.*

As the voids in gravel constitute about 33 per cent. of the total volume, if a little more than this proportion of sand and clay be mixed with it the pores will be effectually closed.

These proportions are, clean common gravel,	62 per cent.
Sharp sand,	22½ per cent.
Good clay,	15½ per cent.
Total,	100 per cent.

Care should be taken, however, in laying a pavement or metalled surface not to place it on a composition of this character as it would produce a result just the reverse of what is required, having the foundation impervious when it should be porous.

*Fanning's Hydraulics.

GRAVEL ROADS.

In their natural condition pebbles or gravel having been rounded by attrition are not of a form suitable for binding into a compact, hard, smooth mass for wearing surface; the chief recommendation of this material is its porosity, which renders it useful for a foundation stratum affording free drainage. An admixture of clay only for the purpose of supplying a binding material or matrix is injurious, as it makes mud and collects water, forming ruts and rapidly destroying the road, thus adding greatly to the cost of maintenance. There are those, however, who advocate the use of a large percentage of the original matrix, found in the gravel pit, which, as the road is compacted should be scraped up and removed. If the gravel is too clean it can never be consolidated, and is continually in motion, causing great wear to the road material, as well as great resistance to traction.

The best practice seems to be to pass the gravel through a screen having $\frac{3}{4}$ -inch meshes without washing, and using only the larger particles on the road, breaking any that may exceed $1\frac{1}{2}$ inches into angular fragments. The gravel thus prepared, should be spread uniformly over the surface of the road-bed to a depth of not more than six inches, and then either be rolled or thrown open to travel. In any case a sufficient force should be employed to keep the ruts raked down as soon as they appear.

THE RESISTANCES.

These, as have been stated, are due to the yielding nature of the surface, or metalling, the grades and the alignment, as well as the friction of the vehicle, atmosphere, etc.

Without entering into a mathematical discussion of the formula it will be sufficient to give some of the values of these resistances as determined practically by the dynamometer, from experiments by Sir John MacNeill and M. Morin. The wagon weighed 21 cwt. To move it at a walk there was required:

On a gravel road laid on earth,	147	pounds, or	$\frac{1}{16}$	of the load.
On a broken stone road,	65	"	$\frac{1}{36}$	"
On a paved foundation,	46	"	$\frac{1}{54}$	"
On a well-made pavement,	33	"	$\frac{1}{71}$	"
On a stone tram-way, per ton,	$12\frac{1}{2}$	"	$\frac{1}{179}$	"
On a railroad tram-way, per ton, . . .	8	"	$\frac{1}{280}$	"

These figures will serve to show how much more effective the power is when applied over a smooth hard surface.

The following extracts from a comprehensive table will also illustrate this point, and give in addition the relation of grades to length of level roadways.*

Table of tractive force on different grades for a wagon weighing with its load, six tons, and moving at a velocity of three miles per hour along a macadamized road in its usual state:

*Aide Memoir. Military Science, Vol. III, p. 336.

RATE OF INCLINATION IN FEET.	Angle.	Force in pounds to draw up hill.	Force in pounds to draw down.	Equivalent length of level road for ascending. — In miles.	Same for the descending wagons.
1 in 600,	0° 5' 44"	286	241	1.085	.9150
1 in 500,	0 6 53	291	237	1.102	.8979
1 in 400,	0 8 36	297	230	1.128	.8725
1 in 300,	0 11 28	309	219	1.170	.8301
1 in 200,	0 17 11	331	197	1.255	.7451
1 in 100,	0 34 23	398	129	1.510	.4903
1 in 75,	0 45 51	443	85	1.680	.3204
1 in 50,	1 8 6	533		2.019	
1 in 40,	1 25 57	600		2.274	
1 in 30,	1 54 37	712		2.699	
1 in 25,	2 17 26	801		3.038	
1 in 20,	2 51 21	933		3.538	
1 in 15,	3 48 51	1,157		4.388	
1 in 12,	4 45 49	1,379		5.229	
1 in 10,	5 42 58	1,600		6.068	
1 in 9,	6 20 25	1,747		6.623	
1 in 8,	7 7 30	1,929		7.315	
1 in 7,	8 7 48	2,162		8.199	

From the above it appears that on a grade of one foot in ten it would require six horses to do the work of one, and that the equivalent length of level road would be over six miles. The table tells its own story and shows the great importance of low grades.

"The surface should be brought to a convexity of six inches from the centre to the sides by laying on good road materials. The ruts should be filled with hard materials from time to time.

"The space on each side between the sods and the fences should be made smooth with an inclination of one inch in a yard from the road to the fences. Drains should be made along the fences, and all water-courses and drains connected with the road should be constantly kept open and free from weeds."

ROAD BIBLIOGRAPHY.

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SPECIFICATIONS

For a Telford road as prepared by the engineers for the Holyhead road:

1. "The road is to be thirty feet wide, exclusive of foot-paths, with a fall of six inches from the center to the side channels.
2. "A sod to be laid on each side of the road, eight inches wide and six inches in thickness, and in such a manner as to form a sloping edge: the top surface of the sods on each side to be exactly on the same level.
3. "On one side of the road a foot-path to be made behind the sod; it is to be six feet wide, and to have inclined surface of one inch in a yard towards the road; and another sod to be laid along the outer edge of the foot-path, eight inches wide, the top of it on a level with the foot-paths.
4. "On the other side of the road a flat mound of earth is to be formed behind the sod, on a level with the top of it six feet wide; the surface to be sown with grass seed.
5. "The waste land on each side, where there is any, between the foot-path or the mound and the road fence, to be dug over and made quite smooth; when these wastes are covered with grass, the sod to be pared off each breadth, and laid on the breadth last dug; when they are not in grass, the new surface to be sown in seeds.
6. "If there is a ditch on the road side of the fence, or if the road fence consists of a high bank, a new post and rail fence is to be made close along the foot-paths or mound, with a ditch on the field side, at least three feet deep."

For parish roads he says:

"Twenty feet in breadth should be carefully set out and defined by a row of sods on each side.

UNIVERSITY OF PENNSYLVANIA,
February, 1890.

PUBLIC ROADS.

By JASPER T. JENNINGS, *New Milford, Pa.*

In the first place we have *too many* roads. Better have a few roads well graded and constructed, than a great number unfit to travel and practically useless. The roads in our county climb too many hills. There is an old saying prevalent here, that when the roads were laid, "the viewers sighted from the top of one hill to another," and never so much as thought about the grade. In many instances this saying seems to be perfectly applicable. But when we come to examine into the cause of this, we find that the early settlers in many cases located on the hills, where the timber was lighter to clear, and when the roads were laid they followed the first paths and were made to accommodate the sellers who had located there. But the lapse of time has wrought great changes. The valleys covered with old logi and heavier timber were settled later; but the roads had been made then, and they could not deprive the hill settlers of them. Their farm buildings having been constructed there, they could not conveniently remove them,

and so the old roads become firmly fixed. Once established, the roads, in most instances, have, remained there ever since.

Individual interest in thousands of cases says, "run the roads over the hills that I may be better accommodated;" but the general voice of the public says, "run them along the streams where comparatively level grades can almost always be obtained, and where the traveling public can be better accommodated, and the cost of transportation lessened." Roads should have been laid out first, and buildings erected afterwards; but such was not the case, and the evil this wrong step produced confronts us to-day.

It is, of course, necessary for cross roads to run over the hills, and sometimes for others; but main lines of travel should avoid them as much as possible. Individual benefit should be taken into consideration more or less in laying cross roads, but in laying main thoroughfares individual benefit should be overlooked for the good of the general public.

Great care should be taken in the selection of proper persons for viewers, and only an experienced engineer, with the best of judgement, should be intrusted with the work of laying a main line of road. Too often do we suffer from the work of incompetent viewers, and learn to our cost the expense and damage incurred after it is too late. I have in my mind now a road recently constructed in my own county, running nearly parallel with a main line of road and only a few rods distant, to avoid two short pitches which might have been easily remedied for two or three hundred dollars, and where thousands of dollars were expended blasting rocks and grubbing trees along a mile of rough craggy hill-side, where the elevation to be overcome is much greater than the old road, which must also of necessity be kept up just the same, which nearly everybody travels still in preference to the new one, and where the principal object of the new road seems to be the privilege of getting on higher ground for the sake of coming down again. True, it may be a small benefit to four or five persons, but is it right to incur such an expense under the avowed object of making a main thoroughfare better when nearly every one admits that it is very much worse, and the traveling public ignores it altogether. Perhaps it might be a good thing to have three disinterested and thoroughly competent men who have had experience in laying out our best roads, elected in every county to perform that duty.

Having laid the road in such a manner as to best serve the traveling public, the next thing is to build it right. There is no doubt but that a macadamized road is the best. But such a kind of road is very expensive and all sections cannot afford the necessary cost. Of course such an undertaking could only be thought of on the leading lines of road, and then on only a small section at a time. Good material is plenty in our State, and such a road could be constructed here fully as cheap as in any other state in the union. Once built, the road is permanent, and very little repairs would be required for a hundred years to come. We expend enough on repairs in half of that time to macadamize every road in the State. It will eventually come to this; but whether we have reached that point in our progress that would warrant the general introduction of the macadamized road even on our main lines, is yet somewhat doubtful. I think we should at least secure a more equal system of taxation than we now have before we attempt such a system. One great improvement that has already been commenced and which should be made universal, is the constructing of good stone sluices. Stakes

should be set where every sluice is needed, in the fall of the year, and good covering stone split out and piled up, to be drawn to the spot on sleighs in the winter. If this method was practiced, such sluices could be constructed almost as cheap as the old fashioned wooden ones. There is really little need of plank for sluices in most places, and why should they not be discarded, and a material of which we are so well supplied, be used to form permanent features of the road.

In construction, our roads should be wide enough to admit of the easy passage of loaded vehicles, slightly elevated in the centre, with a gradual oval slope to the ditches on either side, so that all water will run off readily, and spend its force against the bank of the ditch instead of the road. Our road machines properly handled will shape the road far better than it can be done any other way. The only trouble is, many people quit work when they are just ready to do the best part of the work. Stones and sods are scraped promiscuously into the middle of the road and left to wear down, when they should be leveled with a fine tooth harrow, the stones thrown out, and the road bed well smoothed, shaped and packed. The work should never be done in the mud, or late in the fall, as is sometimes the case, but just at the commencement of the dry weather in the spring, so that it may have ample time to become thoroughly settled before the heavy fall rains and frosts. A day's work at the right time of the year is worth two late in the fall. In fact, I have often seen roads that were actually damaged by work at that time. In such cases it would really have paid the public better to have hired those men to stay at home.

The main thing that should demand our attention in keeping the roads in repair, is to keep the water out. The water does a thousand times more damage than all the teams and loaded vehicles that pass over it. Often at the time of a spring freshet or heavy shower, a single man can do more good with a hoe in ten minutes than forty men can do in four hours next day. Two cents worth of work at the right time and place would save twenty dollars worth of work next day. Would it not be a good plan to have certain persons appointed along the roads particularly liable to washouts, whose duty it should be to open the clogged ditches and attend to the water at such times? Would it not pay the township better than the same amount of tax used afterwards in repairing the damage?

We now come to another very important question. How shall we expend our road taxes to the greatest advantage? Shall they be worked out, or shall they be paid in money, and the work done by contract? In regard to this question, I must answer it in the same manner that I did in regard to macadamized roads. There is not the shadow of a doubt but that better results could be secured by a money tax, and ultimately it must come to it. But are we ready for this step yet? The farmers and laboring men of the country, upon whom this tax must mainly rest, are already groaning under an overwhelming burden of taxation which they can ill afford to bear, and I hardly believe such a law would meet with the approval of the general mass of the tax-payers just at present. Equalize the taxes first, so that every species of property shall bear its just proportion of the public burden, and the farmers will heartily embrace such a law. They know it would be better now, but the excessive burden which they already bear is ruinous, and they cannot afford it.

In regard to the taxation of all classes of capital for road purposes, there can be but one answer. YES; MOST ASSUREDLY, YES. Justice demands it. It is not right for the farmer and mechanic to pay all of

this tax, and the other class of property owners go free. They use the roads, and we build and repair them at our expense, that they may use them free. In my own township we have a road tax of ten mills which the tax-payers work out, five mills to pay current expenses, and five mills special tax to apply on indebtedness; making a road tax of twenty mills or two per cent. The farming population are selling butter at less than the actual cost of manufacture, they are selling cattle and beef and pork for less than cost—they are paying as much for doctors' services and lawyers' fees as they paid in time of the civil war. They are paying higher taxes than were ever known before, and they cannot stand beneath the unjust and oppressive burden. Our people are a loyal and law abiding people, and they do not like to be constantly howling in the ears of those who frame their laws. But something must be done. They know the Constitution guarantees them a just and equal system of taxation, and they demand their rights under that sacred instrument. A general murmur of dissatisfaction is going up all over the land, which it would be well for those in official positions to heed. They know that in every free Republican government the people are the sovereign power, and although corporate capital may form rings and manipulate conventions, the free ballot rests with the people still. They are awakening to this issue, and the time is not far distant when their demands must be heard.

Some have advanced the idea that the corporations of the Commonwealth should pay the school tax, or the road tax, for their share of the public burden, and that that should be permanent and sufficient. Such a law would not be satisfactory. What the people require is a just and equitable tax law that will compel every species of property to bear its honest share of the public burden in each and every branch. A law that will serve rich and poor alike. A law that will afford a fair field for all, and extend favors to none. When this shall have been accomplished we can have better roads, better schools, better courts, and a better government.

THE ROAD QUESTION.

By JOHN C. McNARY, *Houstonville, Pa.*

What a new public road law shall be, is now the leading problem before the people of the country. The experience of the last year has demonstrated the inefficiency of our present system, and something better is demanded by the public mind. But there are "many men of many minds" as to what that new law shall be. Then there is a great State with every diversity of soil and topo-cosmy to consult. There is the material at hand to make a road in one section that is wholly wanting in another. There is a demand for an expensive road in one place that does not exist in another, and what would be the best for one place would be wholly unsuitable or unnecessary in another, and to make a law sufficiently malleable to fit down on every corner an county of our State, and to be just the thing to suit them, is a difficult task indeed.

But can it not be done? Are the difficulties unsurmountable? Our State road commission is now grappling with it, State agricultural conventions are discussing it, but "chaos yet covers the face of the deep," so far as any unification of sentiment has manifested itself as yet, except perhaps in one particular, and that is that road taxes must be paid in money and the old working out system must go.

But our object in this article, although it looks like presumption, is to briefly formulate a law that would cover the case to a great extent as we view it. How shall we raise the money necessary, and then how shall it be applied. There should be a State appropriation distributed pro rata to the different counties in proportion to the taxable value of the property of the different counties, outside corporate limits. The public roads are a great public necessity that even the general government has recognized in appropriating to their construction. Again the expenditure is so great in places that local enterprise would not be able or willing to assume it; and again, there is equity in it as often one county would be required to maintain a good road for the benefit of a neighboring county when the road led to their principal market place. So we find that prestige, precedent and equity unite in favor of a State appropriation.

Then there should be a county appropriation also, for the same reason as given for State appropriation as, townships by their location have unequal burdens to bear. Permanent improvements, such as piking, graveling and under-draining, which we contemplate as the working of this law, would often be more for the benefit of townships beyond than the one through which the work is done. Then again there should be township tax as at present, except it to be paid in money as others are. And then again there should be a certain rate per acre taxed on farms through which permanent improvements are made, as such improvements enhance the value of such farm. By such a system the money could be raised and we think raised equitably, so that in a few years' work a great revolution could be made in the character of our public roads.

We say years, for we cannot accomplish it at once. But this is only half the story. How shall this money be spent and by whom? We would answer first by three county road commissioners, who shall be freeholders in the county, to be elected as follows: The first general election after the law is passed, three shall be elected, but no elector shall vote for more than two. The person having the highest number of votes to be elected for two years, the other two for one year. At any general election thereafter two shall be elected, no elector voting but for one; the person having the highest number of votes to serve two years, the other one year. This will secure a holdover member each year (a great improvement on our system for electing our county commissioners) and also party representation in the board.

They shall have control of the State and county appropriations, also the levying and collecting of the bounty assessed against farms through which public improvements are made.

These funds are for permanent improvements, such as piking, where that is necessary and practicable, or in an extensive system of under-draining as is the great and only requirement up in Erie county according to an article in the paper a few days ago by an Erie county gentleman, or taking out rocks and boulders and making a smooth road bed, which is the public improvement in Montour county or down in the glade counties as they claim, and farther as we believe, will soon be in-

troduced in places an iron road bed somewhat similar to the street car lines.

These commissioners are to decide from time to time what roads shall first be thus improved. They shall issue their instructions to the township commissioners who shall have the work done by contract to lowest bidders to specifications made by county commissioners. When complete to be examined by a joint commission of county and township boards, and if approved, county commissioners to draw a warrant for the payment thereof.

Again there shall be three township road commissioners to be elected and serve just as in case of county commissioners. They shall assess a township road tax as at present, appoint one of their number collector, collect all tax in money and have charge of the road bed, have their work done by contract or by hiring as they may deem best. To make suitable water tables, culverts, &c., and bridges as are within the ability of townships, in fine to have entire supervision of the roads of the township and to appropriate such private material at a fair price to the owner as he may think necessary for the proper and safe repair of the roads, and when the county commissioners order permanent improvements in any given township, they to let the contract and oversee its fulfillment.

All road commissioners, whether county or township, receive two dollars per day for time actually spent in the duties of their office, their claim for services to be returned under oath and paid by warrants drawn on the permanent fund. Two of either board to be a quorum, and the third only employed when the two cannot agree. This will save time and travel often that is practically lost to the tax-payer, as two men can do very much of this work as well as three, saving the one most distant the time and labor of a long journey.

We have now given as briefly as possible a synopsis of what we think could be formulated into a law that would be general in its character and local option in its operations.

We cannot get special legislation although each county in the State has special requirements in this matter.

By the above a county can pike its roads if it has the stone and the demand on the road require it. Because of the resources, a very wealthy county with property very valuable will command a large State appropriation; will be able to make a large county appropriation and therefore be able to meet the large demand such a condition of wealth and prosperity will make on her traveled roads. On the other hand a poor county with poor lands and resources, and therefore not requiring expensively made roads, will neither be taxed for, unless at her own pleasure, nor required to expend largely in repairing her roads. But after all a road law as perfect as the moral law itself would fall far short of the mark unless those commissioners are what they ought to be. We want no politician on that board to spend two years sycophanting round among the people to grind his own axe. We want no kid glove theorist, civil engineer, inexperienced, afraid-of-the-mud fellow. But as a rule a plain, practical, determined man, whose good, hard, sound sense is his stock in trade, who has a mind of his own and dares to obey it. And one of the misfortunes in this whole matter is, that when a man in such a place will be a man, he has, when he has served a term faithfully, been in the way so much of a set of leeches, bloodsuckers or professional job hunters, that they combine to defeat him, and they can always count on the professional politician to help such a scheme. Our

mode of electing these men is certainly worthy of consideration. How much that State and county appropriation shall be we will not now discuss. The amount assessed against land through which permanent improvement are made, should be appraised at one dollar per acre to be computed a mile on each side of the road, except where two roads run parallel to or converging to each other as when less than two miles apart, the land to be computed to half the distance between two such roads or at a cross roads, each road to have its own share of land within the one mile radius, so that no acre of land could in any event ever be made to pay more than one dollar per acre for such permanent improvement.

We hear the remark frequently made that we farmers are now taxed almost to intolerance. I have not studied the present equalization scheme we hear talked of. We know that a farmer must pay the same tax on his farm if covered with a mortgage to the last cent of its value as if he had it clear. The mortgage is also taxed, so in reality two taxes are collected on the same property, and one of them of a class of men not able to stand the injustice. We are taxed for some things that are in our estimation luxuries we could do well without, and it is now time to do without luxuries in taxation. Our State commissioners will be here to discuss this question amongst us.

A BETTER METHOD OF REPAIRING ROADS.

By JOHN G. CLARK, *Lagonda, Pa.*

The question is asked, "is a better method of making roads needed?" If I should put it to a vote of the house, I am sure you would unanimously decide in the affirmative, and without hesitation I will agree. But this much decided, the more difficult question comes up: "What can be done for the improvement of our roads?"

Road making and repairing is a question of great magnitude as well as of the greatest importance. Important to all classes, whether in the town or country. We should free ourselves of the idea that the farmers alone should be held responsible for the condition of the roads, or that they are more interested than others.

If the farmer fails on account of roads, to get his products to market, the citizens of the town are deprived of the commodities they so much need. Many residents of the town use the roads more for either business or pleasure, than people in the country, and properly considered all very much interested.

When we consider the extent even of our own county, with her thirty-two townships, which will average not less than 125 miles of roads to each township, we have 4,000 miles of roads to maintain.

This is a great undertaking of itself, but when we add to this sixty-five counties more we get some idea of what is embraced in a road bill for the whole State.

We are far behind in road improvements. We have many difficulties to contend with. Nature has given us a very productive soil and smiled upon us in many ways, but for road purposes, the limestone clay of our county is the very worst material to be found anywhere.

But some one will say they should all be macadamized. Perhaps they should. I wish they were every one. But before we build let us count the cost. Money answereth all things, but unfortunately for us the money is lacking. There is no doubt money enough in the State to turnpike the roads, but it belongs to the people, and how shall we get the people to devote it to road purposes?

Perhaps our Republican form of government is not favorable to road making. Nothing I believe has ever been attempted by the Government but the construction of the National road, and it was soon donated to the States through which it passes.

And judging from the past we cannot hope for aid from either National or State governments. In a monarchical government, the sovereign decrees that a road shall be made and orders his subjects to work and appropriates money in abundance to complete and maintain it, and as a consequence has a magnificent road. When our friends visit Europe they are charmed with the fine roads over which they pass, many of them constructed centuries ago and still maintained in perfect order.

But do not understand me as favoring a monarchical government in order to enjoy the benefits of good roads. Not at all. I have full faith in our American institutions. We are still young, and as we advance in everything else, we must also in road making.

I would rather wade through the mud as an American freeman, than to enjoy all the benefit of the king's highway and be a subject of the king. The American people will yet solve the question. How we shall make and maintain good roads. And the man that can furnish the plans and specifications by which they can be constructed at small cost, will be anxiously looked for in the future.

As a beginning in the right direction the present system of allowing taxes to be paid in work ought to be abolished. The law in itself is good if properly executed. And if supervisors could be found who would credit each one with the exact amount done, and pay only in proportion to work done, it ought to be satisfactory. But there are few officers who feel the responsibilities of the office sufficiently to meet the ill will of their neighbors in order to get justice to the township, and therefore the go-as-you-please plan is almost universally adopted. The friends of this system will perhaps claim that this defect can and will be overcome. I think it impossible. The slip and go-easy way has been practiced so long that it has become hereditary, and now descends from father to son, and is so inbred in the present generation, that it is impossible to execute the law.

And the plan for selling out contracts for making and repairing roads, which has been adopted in many townships, is no doubt a good law, but is unsatisfactory in many places on account of failure on the part of officers to execute the law faithfully. And no matter what bill may be enacted, we will have some of the same difficulties to meet. But let us not be discouraged. The feeling all over the State that something must be done is in itself hopeful, for if people determine upon it there will be improvement. But we can only hope for gradual improvement.

The work is too large to be accomplished at once. But we should inaugurate a method that will give permanent results from year to year, especially on our leading roads.

The subject has been discussed all over the State and adjoining States. Many of the propositions are wise and some I would regard as unwise. I would most emphatically oppose the construction of roads by issuing township bonds. Let us pay as we go or pull through the mud.

The proposition to spend one-third or more of the road fund in turnpiking is certainly wise. I think the supervisors should have discretionary power to use as much in this way as they think best. There has been some idle talk about macadamizing all our township roads. It is not good nonsense, and those who talk in that way know nothing of the cost of making and maintaining a turnpike road. The managers of the U. T. M. Plack Road Company, which road has been converted into a turnpike, have expended not less than fifteen hundred dollars each year, on ten miles of road, for the last twenty-five years, and the work is not complete. It is useless to talk of macadamizing 4,000 miles of roads in Washington county. But because we cannot do all, let us not fail to do what we can. A good road in one township will have a stimulating effect on neighboring townships. When a man builds a fine house, his neighbors build new ones or brush up the old ones, and the whole community is advanced. We need competition in road making, that our road improvements may keep pace with our advance in other things.

I would make the following conclusions:

1. The making and repairing of the roads of Pennsylvania is a very large work, and a bill for this purpose should be prepared very carefully. There are millions of dollars expended yearly on roads.
2. It is a matter in which all are interested, and if we are to make the needed improvements, it will require the co-operation of all. A law can not be effective without the endorsement of the people.
3. The system of allowing taxes to be paid in work should be abolished and a money tax collected.
4. The plan of plowing and shoveling or scraping large quantities of earth on the road beds each year, has not shown any permanent improvement and should be superseded by turnpiking as far as is practical.
5. There is no hope of either State or National aid, and no inducement for capitalists to invest in roads, and whatever is done must be by the votes of the people.
6. Owing to the character of our soil, the changes of climate, washing rains, &c., the making of permanent roads is necessarily slow and expensive. And if we ever accomplish much, the people must be more willing to expend money in making them. When we undertake the work in earnest we may expect success.

THE ROADS AND ROAD LAWS OF PENNSYLVANIA.

By the Secretary.

It has been the custom of the secretary of the Board to each year direct its work and correspondence towards the solution of one or more important questions, the aim being to settle, so far as the Board was competent to do so, a few important points rather than to expend its energies in the partial solution of many; in this manner the work of the year 1888 was mainly directed to the questions of the fence laws of the State, and by the time the Legislature convened in the session of 1889, the Board was prepared to lay before the members a mass of information in relation to the fence laws of the State, and the require-

ments and needs of our farmers in this direction, which very materially assisted in effecting the repeal of the obnoxious fence law of 1700, and the relegation of the fencing problem to the supervision of our common law. In a similar manner, during the past year, much of the correspondence and work of the board has been directed to the questions of road laws, road construction and road repairs, and this, with the attention called to the questions at the general meetings of the Board and at many of the farmers local institutes, held under the care of the Board, has awakened an unusual interest and has called out a general expression of public opinion in favor of better and more permanent roads.

It is almost universally admitted that nearly every community in the State has expended enough in the repairs of its public roads during the past twenty five years to have macadamized or otherwise permanently improved them; and the admission is as universal that as a rule they are in no better condition than they were twenty five years ago; and in all cases, it is freely admitted, that a change should in some way be effected in both the manner of repairing and in the character of our leading public roads.

It is, however, the case, that while the disadvantages of our present system are freely admitted, no one has any very definite plans for an improvement. At our farmers institutes, we find a great difference of opinion as to the proper plan for bringing about changes which all admit are needed. Much of this difference of opinion is due to a difference in locality by which the force of argument is changed by circumstance, which do not admit of a general application, and the opinion has been freely expressed, that it will be found to be impossible to draft a road law which will be acceptable to all parts of our State.

Another difficulty in the way of any general legislation is to be found in the numerous local laws, which in the days of special legislation were passed indiscriminately for such townships as made application. This evil has grown to such an extent, that the local road laws of one of our largest counties occupy eighty printed pages.

Previous to 1802, the opening and laying out of our public roads was controlled by local authorities, and hence there was no general plan of action; each township opened such roads as were thought proper and levied the taxes for the expense of the repairs of roads without any reference to the action of an adjoining township; hence our present irregular and heterogeneous system which by its elasticity has accommodated itself to almost any kind of road, of any desired width, and repaired upon plans contrived by local supervisors.

Under the act of 1802, the control of the opening of new roads was vested in the several courts of quarter session, but the present objectionable plan of repairing them was still continued. In 1836, the road system was somewhat revised and condensed, but the objectionable feature of working out the taxes, conferred by the act of 1834, was retained. Since 1836 various local laws have been enacted, which in many ways change the manner of repairing the roads, but which have retained many of the objectionable features of the older laws.

In most cases it appears to have been assumed that new laws are absolutely essential to effect the end desired, and that this result can only be attained by some radical change which is to overthrow all of our habits in this direction, acquired only after years of education. But is any such radical change in our laws necessary? Is the fault with the present road law? May it not be in our mode of carrying this law into effect and in the failure of public officers to do their duty under that

law? If the latter is the case, then it will be best to put the present laws into force and by the pressure of public opinion, compel those charged with the duty of repairing our roads to properly perform their duties.

The act of June 13, 1836, which, in the absence of local laws, governs road construction and repairs, gives the supervisors and road commissioners absolute power; the extent of this power is very little understood by our voters and tax-payers, and even by the supervisors themselves, and if carefully examined into, would do away with much of the argument in favor of new and radical legislation. Many suppose that our roads cannot be macadamized without further legislation, but we think it will be found that up to a certain cost, our present general law authorizes any kind of repair or construction which may be ordered by the supervisors, and that by an amendment increasing the maximum amount of tax, the present law will fully authorize macadamizing or any other species of permanent improvement or repair.

The provisions of the act of June 13, 1836, which specially refer to road construction and repair, are as follows:

SECTION 27. The supervisors aforesaid shall have power, and they are hereby enjoined and required, at the expenses of their respective townships, to purchase wood, timber and other materials necessary for the purpose of making, maintaining and repairing the public roads or highways, and to employ, oversee and direct a sufficient number of laborers to execute promptly and effectually the provisions of the law, and the orders and decrees of the courts having jurisdiction concerning such roads.

SECTION 28. The supervisors aforesaid shall severally have full power and authority within their respective townships, to enter upon any land or enclosure near to the said roads, and to dig, gather and carry upon said roads any stones, sand or gravel found on the same which they may think necessary for the purpose of making, maintaining or repairing the said roads, when the same cannot be conveniently obtained by contract at reasonable prices, doing no unnecessary damage to the owners of the said lands, and repairing any breaches of fences which they shall make.

SECTION 29. Whenever the supervisors and the owners of any materials which may be wanted for making or repairing the roads aforesaid, cannot agree upon the price to be paid therefor, the value of such materials shall be estimated by any two of such three persons as may be agreed upon by such supervisors and owners.

SECTION 30. If the supervisors and owners cannot agree upon any persons estimate to the value thereof, the owner of the material may apply to a justice of the peace residing near the place where such materials were taken or may be, and thereupon such justice shall appoint three judicious persons, one on the nomination of the supervisors, one other on the nomination of the owner of such materials, and the third upon his own suggestion, and the decision of the persons so appointed, or two of them, shall be entered upon the docket of said justice, and shall be final: *Provided*, that if either party shall, after due notice, refuse or neglect to nominate as aforesaid, it shall be the duty of the justice to appoint one other person in his stead.

SECTION 31. It shall be the duty of the supervisors aforesaid in making and repairing the public roads, to make and maintain within their respective townships sufficient causeways, of stone or timber, on marshy or swampy grounds, and also to make and maintain sufficient bridges over all small creeks and rivulets and deep gullies, where the same shall be necessary for the ease and safety of travellers.

SECTION 32. The supervisors aforesaid shall have power and authority as aforesaid, to enter upon any land or enclosures, and cut, open and maintain and repair all such drains or ditches through the same, as they shall judge necessary, to carry the water from the said roads.

SECTION 65. If any person working upon any road or highway, or if any one in company with such person, shall ask money or reward, or by any means whatever, shall extort or endeavor to extort any money, drink or other thing of or from any person travelling upon or near such road or highway, the person so offending shall, for every such offence, forfeit and pay a sum not exceeding five dollars.

SECTION 66. If any supervisor shall connive at any person so asking, demanding or contriving to extort money, drink or any other thing from any person travelling as aforesaid, such supervisor shall, for every offence, forfeit and pay a sum not exceeding ten dollars.

SECTION 67. If any person shall stop, fill up or injure any drain or ditch, made by any supervisor for the purpose of draining the water from any public road or highway, or shall divert or change the course thereof without the authority of the supervisor for the time being, such person shall, for every such offence forfeit and pay a sum not less than four dollars, nor more than twenty dollars.

SECTION 68. If any person shall stop or obstruct any public road or highway or shall commit any nuisance thereon by felling trees, making fences, turning the road or in any other way, and do not, upon notice given by the supervisor of the respective township, forthwith remove the nuisance and repair the damage done to such road, such person shall, for every such offence, forfeit and pay a sum not less than ten dollars nor more than forty dollars: *Provided*, That nothing in this section shall be deemed to debar an indictment for any such nuisance, as in case of misdemeanor at common law.

These provisions certainly give the supervisors all the latitude and power that they could ask for; they can take any material for either construction or repairs which may suit their purpose; they may make the improvements of as permanent a nature as they see fit; they can obtain all the labor they need, and by a previous provision of the law, can levy and collect a road tax not exceeding ten mills on the dollar of assessment. In many townships with which the writer is acquainted a tax of from three and one-half to four mills on the dollar is found ample to keep the roads in their present condition; in one case the writer knows that a tax of three and one-half mills produces a fund of \$3,000; a levy of ten mills upon the same assessment would give a fund of \$8,457 or in other words would give the supervisors the same amount as at present for repairs, and the additional sum of \$5,475 for permanent improvements such as macadamizing low and wet pieces of road, and extending permanent improvements each year. Suppose the people of any township agree at a public meeting to support their supervisors in a reasonable tax levy, what will prevent their obtaining better roads and at the same time permanent improvements?

Can we obtain anything more under a new law or can we place the work in safer hands than those of such officers as we can directly control at least every three years? There is probably no class of officers more directly responsible to their constituents than our supervisors, because every one of these constituents is brought directly into contact with the problem which has been placed under the care of the officers.

When we come to summarize all of the items which go to make up

the grand total of the causes of the bad roads of which we so much complain, will we not find that the difficulty is largely due to the apathy and carelessness of the tax-payers themselves? They do not insist upon the proper performance of their duties by the men whom they themselves have, by their votes, placed in a position of trust. If the residents of any township (or even a considerable majority of them) determine to have better roads or to make permanent improvements in their roads, it is in their power to elect supervisors who are in sympathy with the movement and to authorize the levying of a road tax sufficient to enable these officers to carry out the wishes of those who pay the bills.

It is admitted that radical changes come gradually, and while the wished for change in road repairs is coming, there are many inexpensive things which we can do to give us better roads. As a chain is only as strong as its weakest link, so any given length of road will admit only of a load which is to be measured by its worst spot; there are in every township in our State short pieces of road in low and wet places, which are nearly always in bad condition; during the fall, winter and spring the super-abundance of water keeps them wet and muddy; let these be macadamized and put in first class condition, and they will form an interesting object lesson for the encouragement of similar improvements in other pieces of road not quite so bad; in this way we can soon raise the average conditions of the roads of our township, and at a nominal cost which will require very little, if any, increase in the tax rate. The writer is familiar with a single section of road on which for many years past the annual cost of repairs has not been less than \$75, and yet the road is no better than it was when we first knew it thirty-five years ago; the expenditure of less than \$30 in a drain parallel to this road would, at any and all times, have removed the surplus water and would have made it as easy to keep in repair as almost any other section in the township.

There are similar roads in all townships in our State, and their permanent improvement, whether by macadamizing or by draining, is within the power of the people and their agents, the supervisors, without any further legislation. It is often much better to improve the ills which we have, than to rush to others the extent we know not of. It is at least prudent to make available the best of our present system while we are devising and adopting one which may prove no better, for while our Legislature may make laws, it is the people who enforce them by public opinion, and no matter how good the law, if not supported by public opinion, it will fail in accomplishing the desired results.

But to enable the supervisors to properly and economically make these extra improvements, at least a portion of the road taxes should be paid in cash instead of in labor; they will then be in a position to obtain skilled labor, which for the purposes of any permanent improvement, will result in a saving in outlay. But even with the present plan of paying taxes in work, which might be accomplished in the direction which we have indicated.

The Act of April 15, 1834 (section 34) provides as follows:

"That before issuing the duplicate and warrant for the collection of road taxes, it shall be the duty of the supervisors of every township to give notice to all persons rated for such taxes, by advertisement or otherwise, to attend at such times and places as such supervisors may direct, so as to give such persons full opportunity to work out their respective taxes." This provision is somewhat modified by the Act of

May 24, 1887, which provides for the payment, at the option of the supervisors, of twenty-five per cent. of the road taxes in cash, for a specific purpose, and which is as follows:

AN ACT

To enable road commissioners and other officers having in charge the paying, constructing and repairing of public roads, highways and bridges, to purchase necessary and improved implements, machinery, &c., and to provide means thereof.

SECTION 1. *Be it enacted: &c, &c.,* That from and after the passage of this act the road commissioners and other officers having in charge the opening, constructing and repairing of public roads, highways and bridges in any township in this Commonwealth, are hereby authorized, at their option, to purchase for use of their respective districts plows, scrapers, road-machines and such other implements and materials as may, from time to time, be found necessary in the opening, constructing and repairing of said roads, highways or bridges.

SECTION 2. If necessary for the payment of the machinery, implements and materials mentioned and referred to in the first section of this act, the supervisors, road commissioners or other proper officers, having in charge the opening, constructing and repairing of public roads, highways and bridges in the several townships of this Commonwealth, may and they are hereby authorized to collect, in cash, not exceeding twenty-five per centum of the rates and assessments by them respectively laid in each year for road purposes, such cash to be collected in the same manner as other road taxes, not worked out, are by law collected.

Approved May 24, 1887.

In the case of Miller et al vs. Gorman and Preston, (38 Penna. State reports, page 309) certain parties in the county of Schuylkill were assessed with road taxes amounting to \$216.00; as soon as they knew of the assessment they proposed to work out this amount of tax, but the levy was made on their personal property for the amount of the tax duplicate. In this case the defence was set up that the plaintiffs were non-resident; but the court ruled that inasmuch as they had responsible tenants or resident managers they could not be classed as non-residents, and that all the privileges of resident tax-payers belonged to them because they had representatives on the property all the time, or in the words of the court "the vigilance of the tenants took away all the importance from the non-residence of the plaintiffs."

The final decision in the case was that "the opportunity to work out the taxes is a condition precedent to the issuing of a warrant for their collection; where they are assessed against non-residents, notice may be given by advertisement, but the tenant must be permitted to work out the taxes if they offer to do so." In Childs vs. Brown township 40 (Penna. St. Rpt., page 332) it was ruled that "supervisors can make no contracts, the effects of which must be to deprive tax-payers of the privilege to work out their taxes."

It would, therefore, seem that in order to enable the supervisors free scope for the permanent improvement of the roads, that the provision allowing the tax-payers to work out his tax should be repealed; but this in no wise deprives the same tax-payer from working on the roads to the full amount of his road tax, or should he prove an efficient hand, to even a greater amount; the effect of the repeal would merely be to give the

supervisors full control over the expenditure of the road tax, of which they are now, at least partially, deprived by the provision of the act of May 15, 1834, which we have just quoted.

But it does not follow that this clause must be repealed in order to give us better roads, or in order to secure the permanent improvement of our roads. It is claimed that the difficulty at present is due to the fact that tax-payers send boys and old men, at full wages, to work out the tax, reserving the full hands for work on the farm; that this is true to a certain extent is beyond a doubt, but if the tax is paid in money, may not exactly the same evil exist? The supervisors then, as now, will be compelled to depend upon the farmers and tax-payers for their hands; will they then, any better than now, demand full hands for full pay? Will they not, unless a change is demanded by the people, permit the same practices to continue. It is useless to claim that the supervisors are compelled to accept such hands as are sent them; is they are properly supported by public opinion they will demand exactly the same kind of work as they would were the job a private one, and this once obtained much of the demand for the payment of the tax in cash will have been removed. It would, therefore, seem, that much of the evil charged to this provision of our law is due, not to the provision itself, but to a bad condition of public opinion which in public duty permits evils to remain uncorrected, which in their own private affairs would not be tolerated a single day; correct this, and a radical change will be found to immediately follow; let the supervisors (backed up by public opinion) insist that every man who works on the roads shall either do a full day's work or be paid in accordance with what he does do.

Some of our correspondents claim that to insist on the payment of the road tax in cash would seriously embarrass many farmers who already have difficulty in raising cash for rent and interest upon debts; while this is true in some cases, yet there can be no mistaking the fact that public opinion among farmers, as indexed by the discussions at our farmers institutes is largely in favor of a cash tax, with the proviso that in the employment of labor on the roads, local laborers shall have the preference.

To summarize the duties and possibilities of our present system, we have the following as being within the reach of the supervisors:

1. They may levy for road purposes a rate not exceeding (except where interfered with by local enactments) one cent (ten mills) on the taxable property of the township.
2. They may collect twenty five per cent. of this in cash for the express purpose of purchasing implements.
3. They may enter upon any land for the purpose of taking therefrom any material which they may think necessary for the construction or repair of roads or bridges.
4. Before proceeding to collect the road tax in cash, they must first have given every tax-payer an opportunity to work out his tax.
5. If any tax-payer is a non-resident, his tenant or representative must first have an opportunity to work out the amount of the road tax.
6. They are the judges as to how the roads shall be repaired and of the amount of work which shall be put upon them.
7. If they so decide, they have full power to macadamize or otherwise improve the worst places, and to extend such repairs as far as they can secure the co-operation of the tax-payers.
8. They are the judges as to whether certain tax-payers are fairly and honestly working out their tax, and they certainly have the same

right to demand a fair performance of labor for full pay as if they were paying the cash for it.

9. If satisfied that any workmen were shirking their duty, they certainly would and should have the support of every intelligent tax-payer in rectifying the fraud.

10. That if a levy of three and one-half or four mills is not sufficient for road purposes, they have the power to increase it up to the limit named in the law.

In view of these and other facts which might be cited, we think that we are right in assuming that if the roads of any township are not what a majority of its citizens wish them to be, the fault is theirs and should not be charged to fancied imperfections in a law, which are mainly due to the fact that the law is not enforced as it should be.

And we may safely assume that if the people and their officers do not enforce a law, the provisions of which they understand, they will not be any more likely to enforce one which is new to them and which they do not fully understand.

In some counties and townships this conflict of interest has led to the adoption of a compromise plan by which the repairing of the roads is sold to the lowest bidder, who must be a tax-payer and a resident of the township; but this plan only shifts the responsibility, for it still remains the duty of the supervisor or road commissioner to see that the law is enforced and that each man does his duty to the township. Where this plan is in force it is found that supervisors are quite as derelict in carrying out their duty as where the older plan has been retained; in fact, all laws are found insufficient in the one point, viz., the compulsion of the performance of plain duty on the part of the supervisors.

This plan of repairing our roads varies somewhat with the different districts, but the following act governing the repairing of the roads of New Garden and Pennsbury townships, Chester county, may be taken as an index of all under the same system.

SECTION 2. That it shall be lawful for the taxable inhabitants of the townships of New Garden and Pennsbury in the county of Chester, at their next township inspection for supervisors of the public roads and highways, to elect three suitable persons as supervisors, one for one year, one for two years, and one for three years, and one person annually thereafter to serve for three years, any two of whom may constitute a quorum to do business, and whose duty it shall be within fifteen days after their election, and every three years thereafter, to lay out and divide the public roads and highways in said townships into sections not exceeding one-half mile in length, which they shall number and describe in a book kept by them for that purpose. They shall also distinctly specify therein what they deem necessary for the improvement and keeping in good repair the said public roads and highway, with an estimate of the amount of money which it will require to improve and keep in repair each and every section of the said road, respectively, for the term of three years; and when the supervisors shall have so laid out and divided the public roads and highways as aforesaid, they shall within two days thereafter give at least ten days notice, by six or more hand bills put up in the most public places in the said townships, designating the time and place for the taxable inhabitants of said townships to meet, at which time and place it shall be the duty of the supervisors to attend and sell out at public sale, for the term of three years, to the lowest and best bidder, of the taxable inhabitants of the said townships, the said sections of the public roads and highways, according to the terms

therein specified, one section at a time, until they are all disposed of; but no section shall be sold for more than the sum estimated thereon by the supervisors, and if any section or sections shall remain unsold on account of no bid having been made, or on account of their having been bid higher than the amount estimated by the supervisors, they shall be again set up and sold to the lowest bidder, not exceeding the estimate aforesaid, and if any section or sections shall still remain unsold, the supervisors shall afterwards let out such section or sections on private contract: *Provided*, That the said supervisors shall not be allowed, either directly or indirectly, to purchase or contract for any portion of road so sold or let: *Provided also*, That only one-third of the amount of the said sales or contracts shall be paid to the respective purchasers or contractors in any one year, except in cases as are hereinafter provided for.

SECTION 3. Any person or persons who shall purchase or contract for a section of road as aforesaid, shall write his or their names respectively in the supervisors book opposite to the section or sections purchased or contracted for, together with the amount of the purchase or contract money.

SECTION 4. It shall be the duty of the contractors to keep their sections in good and substantial repair, by having the bed of the road raised in the middle and sloping gradually each way to the sides, where ditches or drains shall be kept open of sufficient depth and width to carry off the water, and in order to hasten the gradual wearing away and reduction of the hills, it shall not be lawful to construct crossways or open drains across the bed of the road within fifty feet of their tops or summits, nor shall the crossways or drains be constructed on the slopes or sides of hills of less grade than five degrees; strong embankments at least one foot high shall be made along the side of the road at the foot of the hill, for the purpose of preventing, as far as practicable, the loose earth carried down from being washed away; loose stones shall be carefully removed or covered with earth; should any person neglect or refuse to make the improvements and keep his or her section or sections of road in good repair, as purchased or contracted for as aforesaid, upon complaint of any citizen of the township or of the adjoining townships, made to the supervisors of either of them, it shall be the duty of the said supervisors to examine the section or sections as soon as practicable, and if they deem the complaint well founded, to give notice to the party or parties complained of to make the improvements and put his, her or their section or sections in good repair, according to the term specified therein, within six days thereafter; and if he, she or they shall refuse or neglect to comply with the said notice until the expiration of the said six days, it shall be the duty of the supervisors to have the said section or sections improved and repaired according to the term specified in his, her or their contract, and the cost of improving and repairing the same shall be recoverable by the supervisors of such persons so neglecting or refusing, as other debts of equal amount are by law recoverable, with the costs of suit; and upon a second complaint of neglect or refusal of the same person or persons in any one year, which the supervisors shall deem well founded, his, her or their contract or contracts shall be declared forfeited.

SECTION 5. It shall be lawful for any purchaser or purchasers, contractor or contractors, who may remove out of the said townships, to yield up to the supervisor the unexpired portion of his, her or their term, by giving due notice thereof in writing at least twenty days be-

fore the next election for supervisors; the unexpired term of such purchase or contract so yielded up, and of the contracts forfeited under the preceding section, shall be sold at public sale or let on private contract in the manner and form provided for in the second section of this act: *Provided*, That in case of death or removal out of the township, the supervisor shall pay to the representatives of persons so deceased and to persons so removing, such portions of the money specified in their respective contracts as they may believe them justly entitled to.

SECTION 6. It shall be the duty of the supervisors to inspect all of the roads in said townships at least once in two months, and if they shall at any time find that any of the purchasers or contractors have neglected or refused to keep in good repair any section or sections of road purchased or contracted for by him, her or them, according to the terms specified, they shall give notice to such purchaser, or purchasers, contractor or contractors, as is directed in the fourth section of this act; and if any of them neglect or refuse to comply with said notice they shall proceed as directed in the aforesaid section of this act and enforce the payment in like manner.

SECTION 7. The supervisors of the said townships shall be allowed such compensation for their services as the auditors of the townships may deem just and equitable, not exceeding one dollar for every day they shall necessarily be employed in discharging the duties of their office.

SECTION 8. So much of the laws of this Commonwealth relating to public roads and highways, as is inconsistent herewith, is hereby repealed so far as it relates to the townships of New Garden and Pennsylvania, in the county of Chester.

In theory, this plan of selling the repairing of the roads to the lowest and best bidder is excellent, and if it was properly carried out by the supervisors and by the tax-payers themselves, might furnish us with a solution of the problem; but unfortunately there is the same disposition to shirk the full performance of duty which is so much complained of when the taxes are "worked out;" it is the duty of the supervisors to see that each section is properly repaired in accordance with the written contract signed by the purchaser, but this is not done. The writer has, on his way home from a sale of the public roads of his township, seen a man hauling stone as big as his head into the public road, when he had just signed a written contract not to put any stone on the section which would not go through a two and one-half inch ring; other violations of the contract quite as flagrant can be shown in every township; it then follows that this law, like all others, is efficient or not as public opinion and the officers charged with public duties shall require.

In some of the New England States, notably Massachusetts, the roads are kept in repair by regular workmen who do nothing else, and thus become so expert that they can perform nearly double the labor obtained by working out the taxes on the Pennsylvania plan. If we apply this to some of our townships we obtain the following results; one township with which the writer is familiar has seventy-five miles of roads and expends (average) \$2,300 per annum for repairs, or at the rate of \$30.66 per mile; with wages at one dollar and twenty-five cents per day, this would warrant the expenditure of twenty-four days' work with one man on each mile of road; would not this produce better results than our present plan?

Another township with which the writer is almost as familiar has

eighty miles of road, and annually expends \$3,000 in keeping them in repair, or at the rate of \$37.50 per mile; this would be equivalent to an outlay of thirty days work per year per mile of road.

No doubt by the use of teams, which could be hired from adjacent farmers, by the use of the implements belonging to the township, this could be still further extended and amended so that the work of one man would accomplish even more than we have suggested.

It has been urged against such a plan that it does not provide the extra help needed in case of a sudden flood or other emergency; but the law could be readily arranged that it would empower the supervisor to call out extra assistance for any emergency which might make it necessary.

In addition to the laws which we have quoted as affecting the payment of road taxes and their expenditure, we may quote the following, both of which, inasmuch as they require payment in cash from the road tax fund, more or less affect the question under consideration: the act of May 3, 1879, if carried to its full extent, might require twenty-five per cent. of the road taxes; if in addition to this twenty-five per cent. more was used for the purchase of implements, but it is doubtful whether this law has ever been taken advantage of to any considerable extent, and it is perhaps well for the quality and condition of our highways that it is not; it provides as follows:

SECTION 1. *Be it enacted &c.*, That any person liable to road tax who shall transplant to the side of the public highway, on his own premises, any fruit, shade trees or forest trees of suitable size, shall be allowed by the supervisor of roads where roads run through or adjoin cultivated fields, in abatement of his road tax, one dollar for every four trees set out; but no row of elms shall be placed nearer than seventy feet, except locust; which may be set thirty feet apart, and no allowance, as before mentioned, shall be made, unless such trees shall have been set out the year previous to the demand for such abatement of tax, and are living and well protected from animals at the time of such demand.

SECTION 2. Any trees transplanted to the side of the public highways as aforesaid in the place of trees which have died shall be allowed for in the same manner and on the same condition as in the preceding section.

SECTION 3. No person shall be allowed an abatement of his highways tax as aforesaid more than one-quarter of his annual highway tax, and no one shall receive an abatement of tax for trees planted previous to this act.

SECTION 4. Any person who shall cut down, kill or injure any living tree planted as aforesaid, shall pay to the supervisors of roads as aforesaid, fifty cents for each and every tree cut down, killed or removed, be collected as other road taxes are now collected.

The Act of June 25, 1885, also provides for the payment of money from the township road fund, but like the act of May 2, 1879, has only been taken advantage of to a limited extent, and by its own limiting provisions is not capable of being taken advantage of for the absorption of road taxes to the same extent: its provisions are as follows

SECTION 1. *Be it enacted, &c.*: That a supplement to an act to provide for the erection and maintaining of watering troughs for the use of horses and cattle on the public roads of the Commonwealth, and providing penalties for the injury and destruction of the same, approved the twenty-eight day of April, Anno Domini one thousand eight hundred

and seventy-six, which reads as follows "under the sanction and supervision of the supervisors of roads or road commissioners of the respective townships, or council or persons having charge of streets in the respective boroughs of this Commonwealth, any person or persons who may erect and maintain in good repair a public watering trough of not less than six feet in length, twelve inches in width and ten inches in depth in the clear, of either wood, stone or iron, and have pure clear water continually running into the same, except in hard freezing weather, by a pipe, pipes or otherwise, upon the side of the public highway, erected of sufficient height and of easy access, suitable for watering horses and cattle, and approved by the supervisors or road commissioners of such township, or persons having charge of the streets of the boroughs, shall be entitled to receive from the road fund thereof a sum of money not exceeding five dollars annually, as shall be agreed upon at the time of the erection of the trough: *Provided*, That the town council or person having in charge the streets in the several boroughs may erect proper and suitable watering troughs at an expense not exceeding twenty dollars," is hereby amended and extended so as to read as follows, to wit: That under the sanction and supervisions of the supervisors of roads, or road commissioners of the respective townships, or council or persons having charge of the streets in the respective boroughs of this Commonwealth, any person or persons, or chartered societies not for profit, the object of which shall be to erect and maintain in good repair a public watering trough, of not less than six feet in length, twelve inches in width and ten inches in depth, in the clear, of either wood, or of stone, except that the stone troughs shall not be less than two feet in length, and have pure clear water continually running into the same, except in hard freezing weather, by a pipe, pipes or otherwise, upon the side of the public highway, erected of sufficient height and easy of access for watering horses or cattle, and approved by the supervisors or road commissioners of such township or person having charge of the streets in boroughs, shall be entitled to receive from the road fund thereof a sum of money not exceeding five dollars annually, as shall be agreed upon at the time of the erection of such trough: *Provided*, That the town council or person in charge of the streets in the several boroughs may erect proper and suitable watering troughs at an expense not exceeding twenty dollars: *Provided further*, That after the first payment and before receiving any subsequent annual payment, such chartered society shall publish a statement attested by the president and secretary certifying that all the moneys received from the road fund, as provided for by the said act, has been expended in the erection of troughs and supplying the same with water, or in keeping those already erected in proper repair: *Provided*, That the town council or person in charge of the streets in the several boroughs may erect proper and suitable watering troughs at an expense not exceeding twenty dollars: *Provided further*, That after the first payment and before receiving any subsequent annual payment, such chartered society shall publish a statement attested by the president and secretary certifying that all moneys received from the road fund, as provided for by the said act, has been expended in the erection of troughs and supplying the same with water, or in keeping those already erected in proper repair: *Provided*, That if more than one watering trough is erected and maintained within five miles on the same road, but one such trough shall be entitled to the benefit of this act, and the oldest and first trough shall have the preference."

At the annual meeting of the Board, as will be shown in detail by the minutes, the questions of road construction and repairs were considered under three heads, as follows:

1. The payment of the road tax in cash instead of in work as is provided for by the present law.
2. The taxation of all kinds of property for road purposes.
3. The establishment of some kind of county supervision for the construction and repair of township roads.

These questions were also brought up at many of the fifty three farmers' institutes held under the care of the Board; but at the institutes an additional item or inquiry was added, as follows:

4. Should the State aid in the permanent improvement of township roads?

At the annual meeting, and, with one exception at the institutes, also the question of the payment of the tax in money instead of in work, was decided affirmatively by a large majority; in the exceptional case the question was misunderstood and a request was made that it might be reconsidered and the vote re-taken; in this case the meeting by a majority of two decided that the road tax should be paid in work rather than in cash.

In the case of votes at our institutes an analysis of the result shows that the negative votes were cast by those who paid small amounts of tax, and who were either renters or non-property holders; it also was shown that those who paid by far the largest amount of the taxes were decidedly in favor of a cash payment.

The main argument used against cash payment was, that in many sections those who rented farms or who owned farms already heavily mortgaged would be unable to raise the necessary amount in money, or if raised, it would be at the sacrifice of personal property. The best answer given to this argument was the fact that in counties or townships where the repairing of the public roads was sold to the lowest bidder, no such hardship was found to exist. And in this connection it should be remembered that no matter what system of repairs is adopted, the work must be done by neighboring farmers and their men, and in this manner the cash very soon finds its way back to the pockets of the taxpayers.

In the discussion of the question of levying road tax upon all kinds of profit yielding property, there appeared to be very little difference of opinion, all being favorable to such a change. In every case in which a vote was taken at an institute, the majority was overwhelmingly in favor of universal taxation at least for road purposes. It was claimed that the result of such taxation would be to increase the amount of money available without increasing the present rate, and that the additional property thus taxed would, in many cases, double the amount of available funds. One objection urged was that many townships in which corporate property was held, would be greatly benefited, while others not so favorably situated would not increase the amount available. On the other hand it was claimed that such townships would need the largest amount for repairs and that in very many cases it was the teams of corporations which were making these repairs necessary.

Inasmuch as this phase of the question and that of State aid for road purposes were almost inseparably connected, they were usually discussed together.

In a majority of cases it was decided that this increased tax might be paid into the State treasury, as the tax on corporations is at present, and

then distributed to the local officers upon some equitable basis similar to the manner in which the State appropriations to the public schools now reaches the directors. The consideration of a proper and just plan for making this distribution clear, proved that there was on this point no little difference of opinion, and numerous systems of distribution were proposed and fully discussed; among them were the following:

1. That it should be distributed from the State treasury to the supervisors or their treasurer, in the same manner as is now adopted for the distribution of the school fund.

2. Its payment to the local or township supervisors from the State treasury, through a county superintendant of public roads or a county engineer.

3. Its payment from the State treasury to the local officers upon the basis of the tax as now levied locally, giving each a certain percentage in exact proportion with their present tax levy.

4. Its payment from the State to the county treasurer to be by him distributed to the proper local or township officers.

5. Its payment to local officers in exact proportion to the number of miles of road in the township, or at a fixed amount per mile of road.

6. Its payment to the local officers upon proper certification that a certain amount had been expended from the township fund for the permanent improvement of the roads of the township.

7. The establishment of a State Department of public roads, and placing the whole duty of distribution upon the department, allowing it to exercise more or less control over county supervisors or county engineers.

8. The levying of the tax on property now not taxed by the local officers, and its collection and expenditure with the other local taxes for road purposes.

In the discussion of this topic at the general meetings of the Board, and at local farmers' institutes held under its care, numerous points were brought out, among which were the following, which are here given, not with the endorsement of the Board or its secretary, but for information.

1. That in the present depressed condition of all agricultural interests, it was not advisable to add still more to the burden by an increased tax upon real estate for road purposes.

2. That any increase in the amount of road tax levied should be obtained from certain classes of profit bearing property not now reached by local taxation. And that the inhabitants of towns and boroughs, who do not hold real estate, but have other profit paying property, are as much interested in the improvement of public roads as the owners of real estate upon whom the burden has heretofore fallen.

3. That no State Department of Public Roads should be created, and that if a State appropriation for public roads was made, it should be distributed in some way as not to involve an increase in the number of either State or county officers.

4. That all classes of property should alike bear their full share of all repairs or improvements to public roads. And that the owners of real estate should have the privilege of deducting the amount of mortgages from the taxable return of the property.

5. That appropriations for the State treasury for road purposes should not be used to decrease the present tax levy, but should in all cases be used for permanent improvement of some character to be specified by law.

6. That direct taxation of classes of property not now taxed for road purposes, would cause unfair and unjust distribution of the fund for permanent improvements.

7. That townships along the lines of leading railways, having an aggregation of corporate property, would be greatly benefited by direct taxation and collection, while those not so favorably situated would receive very little, if any, increase.

8. That the management of the repairs of public roads should remain in the hands of local officers who are directly responsible to the people for any mismanagement or mis-appropriation of road funds.

9. That State aid might very properly be distributed on the basis of the regular tax levy for road repairs, thus giving the greatest amount of aid to such localities as were raising the greatest amount of tax. It was claimed that such localities as were so situated as to require the greatest cost of repairs were properly entitled to the largest share of the State appropriation.

10. That the number of supervisors or road commissioners should rather be decreased than diminished, and thus avoid the present difficulties which arise from a divided authority; and that the amount of salary or pay saved by the decrease in number should be used to increase the salary of the remainder; at a number of the institutes it was strongly advised that there should be put one supervisor to each township, and that he should be held directly responsible for the condition and repairs of the roads.

11. That more attention should be given by township officers to *permanent* repairs, and that the taxes now levied and collected, if economically applied should in part be devoted to macadamizing the low places and to other improvements of a permanent nature. In some cases an increase of the tax levy, specially for permanent improvements, be made and strictly applied to the purpose intended.

12. That the present tax levy, if expended upon a business basis and paid in cash to the supervisors, should and would keep the roads in as good repair as at present, and give a balance for permanent improvements of the kind alluded to above. It was, in some cases estimated, that two-thirds of the present tax, if paid in cash, would accomplish as much or more work than is now obtained from the whole levy.

13. That, in the opinion of many, the present condition of our public roads was due mainly to a want of efficient work on the part of the township officers, and was not due to any radical defect in either the general or local laws. It was claimed that the act of 1836, and so far as known, all local laws, gave the supervisors ample power to keep the roads in good repair in any ordinary season, and that the power to call out help was a sufficient provision against contingencies.

14. That in many counties much of the bad condition of the roads was due to the prevalent system of putting all the work on them during the spring and autumn, and allowing them to get out of repair during the remainder of the year. On this account it was claimed that if men were employed on the roads during the whole of the working season, they could, by a little work at the proper time, save large future expenditure, and that in this such a change of system would prove economical.

15. That in some cases the present width of the road operated against its economical repair, and that if some of our present roads were decreased in width, it would be beneficial to the public and increase the efficiency of the road. An instance was cited of a road which was laid

out to a width of fifty-five feet for a number of miles; it was so wide that it was difficult to move the earth from the side ditches to the middle, and as a consequence was usually hollow in the centre. It was claimed that thirty-three and one-third feet was an ample width except in deep cuts and other special cases.

16. That the expenses of macadamizing (even at the low estimates placed upon it by members of the Board) placed it beyond the reach of the average township fund, and would effectually prevent its general application. At some of the institutes it was claimed by practical men that an ordinary township road could not be properly macadamized to the width of fifteen feet at cost of less than \$2,250 per mile, and that the annual average repairs for the twenty-five years following its construction would be not less than fifty dollars per mile.

17. That the proposed plan of authorizing townships to issue bonds for permanent road improvement was dangerous, and not to be recommended for general adoption. It was admitted that while such bonds would form a good investment, they would, at least in some case, give rise to political manipulation, and in all cases end in trouble for the township.

18. That in essays read before the general meetings of the Board, and before local farmers' institutes, the estimates given were misleading and calculated to give a wrong impression; it was claimed that the cost as therein given was for roads of an insufficient width, and with the stones of an insufficient depth to prove lasting under ordinary travel; and further, that the estimates were for localities in which the stone could be obtained at little cost, either for breaking or hauling.

19. That the report received at some of the meetings of the Board warranted the belief that the annual cost of the repairs of macadamized roads had also been under-estimated. At one of the meetings of the Board it was stated that the average cost of the *turnpikes* of Lancaster county was not less than \$5,000 per mile, and that the repairs amount to about \$150 per mile annually. On the other hand it was claimed that an ordinary township road could be macadamized at a considerably less expense, and that the annual repairs would not be so great. It was also stated that it was found that it was not economical to macadamize these turnpikes with any less depth of stone than was now used, and that any decrease in cost in the township road, must be obtained by decreasing the width of the macadam.

20. That probably the most feasible plan, in the present condition of taxation and public opinion, would be to macadamize or otherwise improve the low and wet pieces of road which are to be found in nearly all of our townships, and after these were all brought up to a proper standard, to extend the work to other sections of the roads. It was claimed that an increase in the local rate of but one mill would, in five years, produce a marked improvement in the roads of any township to which this plan of permanent improvement was applied.

21. That in many cases the expenditure of a small amount for a well constructed drain, parallel to a wet piece of road, would make it as good as any other road not macadamized, and that such expenditures would be found profitable in nearly all the townships of the State. It was claimed that in many cases it was the surplus water which could not escape by proper natural drainage which made sections of road so bad during the present season, and that if properly drained, macadamizing would not be found to be necessary.

22. That the proper carrying out of a law prohibiting the formation

of "breaks" or "cross-ways" at the top of long hills, would, in course of time materially assist the natural wear in reducing the grade of the road. Instances were stated, in which the removal of a cross-way at the top of a hill, had in less than five years resulted in a material change in its average grade and in the difficulties of the ascent.

23. That the laying out, constructing and repairing of the public roads was a business, and that it would be found most profitable to keep good and efficient men in office, even though they receive better pay, and that while it was not necessary that the township supervisor should be an educated engineer, yet more or less knowledge of practical engineering was essential in a good and efficient road supervisor. By some it was claimed that efficient county supervision was essential in laying out all new roads, and that less attention should be paid to private wishes, and more to the good of the public in such work.

24. That in very many cases the amount necessary to macadamize a given piece of road, would, if expended in reducing the grade of its hills, do much more good to the traveling public, and at the same time make an improvement of a more permanent nature, and involving no annual expenditure for repairs; cases were cited in which the expenditure of \$10 had so improved a given section of road, that one-third heavier loads could be hauled over it; other cases were cited in which neighboring land owners had turned out and by a combination of two days work, had improved a section of road at a less cost, and to an even greater extent.

25. That the systematic use of properly constructed road scrapers and other modern machinery would very materially reduce the cost of repairs, and that this reduction would be greater each year after the first one, as the roads would soon get into proper shape for their economical use. It was also claimed that the use of the scraper was beneficial because it practically discouraged construction of "cross-ways" at any point, and especially on the tops of hills.

26. That competition and the increase in the number of patents had decreased the cost of road scrapers, so that they were not within the reach of any township in the State, and that in the larger townships it would be found profitable to have more than one. It was claimed by those who had considerable practical experience in their use that a good scraper (especially after the road was in proper shape) would, with four horses and three men, do more than twenty-five men with shovels, and that in this manner the expenditure was in the ratio of about ten to forty-five, and some claimed, in the ratio of ten to fifty.

27. That under the present condition of our road laws it would be found good public policy to collect the road taxes in cash, pay them over to the supervisors who should purchase improved implements, which, by the use of the teams of adjacent farmers, would not only place the roads in much better condition, but at the same time do it at a greatly reduced cost.

28. That where this plan was adopted it might be well to place some limit upon the supervisor as to the extent to which he could use his own teams and hands. On the other hand it was claimed that a team which was accustomed to working the scraper could do much more in a given time than one not so used to it; and that in the same manner men who were used to working on the roads were more valuable to the township than ordinary farm hands.

29. That any increase in the number of local officers or their salaries should be avoided, as in the opinion of many much loss now results

from a division of authority and frequent changes, by which a newly elected supervisor, from a difference of opinion or other cause, often reverses the work of his predecessor; it was claimed that frequent change in local officers was detrimental because it prevented the adoption of any definite line of action or any special system of permanent improvements.

30. That any general plan of improvement, if not applicable to all roads, should first be directed towards the improvement of the leading lines of travel between the larger towns and to the roads leading to railway stations. And that after these were placed in good condition, attention could be directed to the minor roads not so much traveled. It was further claimed that the object in view should be "the greatest good to the greatest number," and that the most traveled roads should therefore be first improved.

31. That in many cases it would be found to be more economical to improve the present ones than to lay out new ones, very often for the benefit of the few at the expenses of the many. Cases were cited in which \$3,000 had been expended in building a new road around a moderate hill, when less than that amount expended in grading would have made a much better road than the new one, often constructed over poorly drained ground.

32. That in laying out and constructing public roads, more attention should be given to the rights of the traveling public and to their interests and less to the interests and wishes of private individuals interested. Cases were cited where the public, in order not to cut the farm lines of an individual land owner, had for years been compelled to travel one quarter of a mile further between two points not three quarters of a mile apart.

33. That in some case the plan of selling the roads out to the lowest bidders had resulted not only in a better condition of the roads, but that this increased benefit had been obtained at a decreased cost to the township. It was claimed that when roads were thus sold out, the contract should be for a term of years, otherwise an individual placing his road in good condition would be forced to buy it at the expiration of his term at a greatly reduced price, and that this price would often be forced upon him by some one who, if he became the purchaser, would suffer the condition of the road to retrograde, until at the end of his term it would be sold for a greatly increased amount, possibly to the tax-payer who had formerly placed it in good order.

34. That the general system of repairs by which the streets of cities and towns are kept in order might, at least to a certain extent, be extended to townships. This it was claimed might carry with it the universal taxation of property for road purposes.

35. That it might be found profitable to repair our public roads upon the same general plan as is adopted by railroad companies, viz: of placing the roads of the townships under the care of a foreman and a gang of men who shall all the time (when the weather is suitable) be at work in making repairs, &c. That in this way we would soon have an efficient corps of road menders who could accomplish nearly double the amount of work of ordinary workmen.

36. That in the adoption of such a system it might be found economical to sub-divide the repairs in such a way that each man should have his special sub-division for the condition of which he could be held responsible. All would of course work under the general direction of one township supervisor or engineer.

37. That it was possible to permanently improve our public roads and apportion the expenses among adjacent property owners in proportion to their distance from the improvement; or in other words, to assess the expenses in proportion to the benefit; this plan has been adopted in Ohio with excellent results. It was claimed that the building of a good macadam road from a farm to the nearest railway station would increase the value of that farm fully five dollars per acre, and that less than this amount would make the improvement.

38. That the demand for improvements in the public roads is strongest in the south-eastern portions of the State and at points nearest the largest cities, and that it is in such districts that improvements would naturally commence. It was also claimed by some that the present desire for improvements originated in and was mainly confined to these districts of the State.

39. That in the opinion of some, the improved road of the future will be a steel or iron rail of sufficient width to ensure easy travel with wheels of the present width and construction, and eventually this kind of road will be constructed more economically than the macadam roads. It was claimed that a steel rail constructed somewhat after the manner of those used in street railways, would be found to answer the purpose; but no estimates of the cost of construction were given.

40. That an erroneous opinion exists as to the comparative rate of taxation for road purposes in different portions of the State; that at some institutes this rate was stated at nine mills on the dollar, at other but three or four. Examination will usually show that these differences are largely due to difference in the assessment; thus in some sections the taxable property is valued at nearly full value; in others it is valued at about one-half value; this of itself would make all the difference between a levy of four mills and one of eight.

41. That many townships and communities would willingly bear an increase of the rate levied for road purposes, provided they had some assurance that the amount thus raised would be expended in permanent improvements and not wasted in expensive but inefficient "repairs." This was very forcibly illustrated by the addresses of delegates, from the more thickly settled counties, at our annual meeting held in Harrisburg. They assured the Board that the people would willingly pay one-third more tax if they thereby obtained a fair equivalent for the money.

42. That a large portion of the dissatisfaction expressed at the condition of the public roads is due to the long continued wet weather and a combination of circumstances which may not again exist for many years, but which, on the other hand, may exist even to a greater extent next year. That under ordinary conditions the roads of our State are not worse than those of other States with a similar variety of soil and climate.

43. That it will be found very difficult to frame a general law which shall be satisfactory in its application to all the different localities in the State; and that therefore many of its provisions should be permissive rather than mandatory. On the other hand it has been claimed that such legislation will not come within the power of the Legislature under the new constitution. It has been generally admitted that the most troublesome feature of the proposed law will be a legal definition of "a permanent improvement" of a public road. Opinions differ as to what would be understood by such a term. Many have inferred that the contemplated law will make macadamizing obligatory;

no such intention has been advanced by any one, and such a feature would be fatal to any law, however good it might otherwise be.

44. That the adoption of a general system of road repairs is impossible so long as the present local laws are in existence, and that the preliminary step, after the formation of the general law, would be to repeal local laws.

45. That a general law relating to permanent improvements should not specify the nature of the improvements as differences in locality require differently constructed roads; in some townships where stone is close at hand, macadamizing may be the most economical permanent improvement, while in others this plan would not be admissible at all on account of its great cost.

46. That the substitution of wide tires for narrow ones for use of common earth roads would result in an improvement of the roads, especially at a time when they are drying out in the spring.

47. That the planting of trees along the public roads should not be encouraged except for its shade, as they prevent the road from drying up after a heavy rain. In fact it was usually believed that trees were a disadvantage near the public road because their roots would sooner or later lead to inequalities in the surface and to the formation of permanent ruts.

48. That but few farmers appreciate the saving to themselves, their wagons and teams by the improvements of the public road. It has been estimated that a good macadamized road will enable the adjacent land owner to haul his products to market at a saving of at least thirty per cent., which, when applied to the products of a large farm, is an item of no small importance.

49. That if this saving in expenses and other attendant advantages could be fairly valued, they would more than pay the expenses of the improvement, and by the increase in the market value of the land would prove a profitable investment.

50. That the general interest awakened is a proof that the people of our State demand some improvement in their road laws, and that they will closely examine all proposed laws relating thereto.

ROADS AND ROAD LAWS.

By Rev. J. H. WHITE, *Milroy P. O., Pa.*

The public roads of Pennsylvania are in importance second only to the common schools. Our present methods are about as expensive and worthless as they well could be. Armagh township, of Mifflin county, may, for instance, be taken as a representative township. It has spent on its roads during the last twenty-five years about \$60,000 without making any signs of improvement. In that township, at the ordinary rate of wages, six men, two horses and a wagon could have been kept at work two hundred days in the year for \$1,550, a little more than one half the amount of the average tax annually assessed. Comment on this state of things is useless. Making good roads is a work of many years, and it will never be done without a system, or without getting every

township to undertake it or persevere in it. This will never be done until the State takes some supervision of the work and lends a hand. The people are tired to death of the present methods, but they are powerless to help themselves. The State must come to their relief.

State aid and State supervision should go together. Without the aid, the supervision would be an impertinence, and without the supervision, the aid would not be wisely used.

A few good roads built by the State at great expense of the peoples' money would not meet the demand, as these roads would benefit comparatively a small portion of the people. Good roads centering in the county or other large towns, while very desirable, are not all that is needed. Many townships do no heavy hauling and very little traveling on their roads. Their hauling is to the nearest railroad station or their traveling is generally done in the cars. For the State to give aid in making the main roads into country towns and thus assist the townships in which these roads are located, and which use them most, and leave the remote townships unaided to keep up their own roads, would be unjust and oppressive. Each township uses most of its own roads and is most interested in keeping them in good repair. The laws providing for State aid and supervision should apply equally to every township in the State. If every township will make its own roads good, then there will be good roads into all the towns and all over the county and State. Any system of State supervision or assistance which does not apply equally to all the townships will not and ought not to be satisfactory to the people. Let us have State supervision and aid, but let it apply equally to every township in the State.

This it seems to me can be done in a very simple way which all persons can understand and appreciate. Let our road laws be patterned after our common school laws. There should be a State superintendent, each township should elect a board of directors to hold offices for three years. If there are county superintendents, they should be chosen by the road-directors of the county. But instead of county superintendents, it would probably be better to have a number of State engineers who could, under the direction of State superintendent, go into every township, at least once a year, to help the township directors to locate the roads or to decide as to the work to be done. More competent men could be secured in this way than could be found in many of the counties. It would not take nearly as many men as there are counties. They would thus also represent the State and not the counties, and would be the agents through which the State superintendent would exercise supervision. The directors could, with the assistance of one of the engineers, locate new roads. They could also hire the supervisor and men to do the work, or give it out on contract and see that it was properly done. They also could levy the road tax and do everything necessary for the success of the work undertaken.

New laws providing for the proper location of roads are necessary. The State engineer and township directors should be required to see that the roads are properly located before they commence to improve them. They should have power properly guarded from abuse, to open new roads, and if they cannot get the right of way, to have the damages afterwards assessed as in the case of railroads. As the roads are, for all ages to come, present private interests should not stand in the way of the public good. There are in many cases now more roads than are necessary, as they are run over hills and around farms and fields. The people do not like to make a move to correct the evils which are now

apparent. Road viewers appointed by the courts will not often report favorable on a new road, however desirable they may see it to be, if some interested parties oppose it. The State in giving aid should make it obligatory on the townships to properly locate their road and should send its agent, one of its engineers, into the township to help to do the work.

The State appropriation to public roads should be apportioned to the townships in proportion to the number of miles of road to be kept up, and the amount of tax levied by the township. It should be conditioned. Where needed, it might go for a year or two to help to pay for the right of way and for opening new roads. After that, it should be given to be used with a specified amount, levied by the township directors, towards macadamizing some portions of road selected by the directors and State engineer. The townships should give for this purpose two or three times the amount of the State apportionment, as the object of the State should not be so much to do the work as to direct, assist, encourage the townships to do it. The law on macadamizing should specify the breadth of road to be macadamized, the size of the broken stone, and the depth of stone to be used. In most country roads, it would be better to have only half of the road macadamized for winter use, and the other half made into a good smooth, clay, summer road.

There is one other point which needs attention. The bridge law should be changed. A few years ago there was a law passed which made it the duty of counties to keep up river bridges. In Mifflin county there are three bridges over the Juniata River, which has cost the county about \$100,000. They were swept away last June and it will take another \$100,000 to replace them. This is something of a burden in a county of 20,000 inhabitants. But the injustice is not in that, but in this: most of the townships have few or no bridges to keep up, while two or three townships have many bridges. Armagh township has over twenty bridges of considerable length. For these townships to be taxed to keep up the river bridge which they never use and at the same time keep up their own bridges is unjust and a constant cause of complaint. The bridge law ought to be extended so as to include all the bridges in the State over a specified length, say 15 or 20 feet. This would lay the burden of taxation equally on all parts of the county. As many of the wealthy counties of the State have very few bridges and other counties, often the poorer ones, have many, it would equalize more fully the burden of taxation if all bridges were built by the State. It would also relieve somewhat the owners of real estate now so heavily burdened, and slightly increase the percentage of tax on personal property.

PUBLIC HIGHWAYS.

By W. ILLECK LONG, *Reigelville, Pa.*

(Read at Reigelville Institute.)

Whatever touches the nation's pocket book will also touch the nation's intellect, and when that is once touched there is sure to be some loud thinking done, and that sometimes leads to warfare. The storms

of the last year have been unusual, and they have been the means of calling out large forces of men to keep our highways in repair, and so full taxation for highway purposes is a thing that could reasonably have been expected. Under any circumstances ordinary or extraordinary our highways are not constructed or maintained except at a cost. Money alone will not give us our ideal highways, but wherever these are found, there must be employed both mental and manual labor, and these should meet with their just compensation.

For the accomplishment of our object—allow me to make the following statement—that of securing ideal highways,

For the construction and maintenance of good and permanent highways we want:

1. Competent, honest, and economic men to make them.
2. Suitable material and machinery.
3. Good and economic methods.
4. Just and equal taxation.

In speaking of the competency of those who would give us the most efficient road service, it may not be amiss to say they should be competent by a right education of the head, the heart and the hand. A strong arm and a broad fisted hand may toil without ever giving way to fatigue, and yet do it unskillfully. The same kind of a hand belonging to a much more intelligent man, may toil, working against the best interests of the community at large. The only hand that will perform the true service required of it, is that which is guided by principles of right, and the man for whom we cast our ballot as chief of the highway ought to be a *high toned man of honor* and even if he is high toned in no other respect.

No sooner is a man proven dishonest than his character is impeached, and surely you or I would not choose a dishonest man to represent us anywhere. It seems to me that the play of dishonesty is a difficult one whether in township, county or State affairs, since all official acts may come under the scrutiny of careful watchers. Whilst holding honesty to be one of the pre-requisites of the highway official, I shall take it for granted that the majority of our public officials are honest, and never until I have certain proof to the contrary, will I attribute dishonesty even to my bitterest enemy.

Economic habits belong to the habit of honesty; and an extravagant use of public means especially where there is willful wastefulness seems very much like a wrongful use of means. Between considering the suitable highway chief for the township, or for the State or the nation at large, there may be a wide difference, and yet it is safe to assume that he who has all the qualifications necessary to engineer the highways of the State or the nation likewise, has all the qualifications necessary for the engineering of so small a part of the State as the township.

In these days of dishonesty, falsehood and grasp there is little wonder that so many of my township men should frown at the thought of these highest of all highway officials. They are apt to think of the high salary to be paid them and of the curtailment of their own right to work out their taxes. They are firm believers in the democratic principle, equal rights to all, and I suppose that the majority are groaning underneath the great burden of heavy highway taxation to-day. But, I have taught myself to *honor* the men who in the great struggle of life have proven themselves to be men of honor, and to such I believe all the great interests of the State may be safely intrusted.

Our highway chief may have made a study of everything pertaining to the highway—the engineering, economic and legislative features of construction, re-construction and maintenance, the advantages of thoroughly scientific treatment, &c. He may be thoroughly up in the department of practical labor, and may be able quickly to summon all his forces of men, and yet he would not be able to construct our ideal roads without the use of suitable material and the employment of suitable implements and machinery. I will not stop to mention all the machinery necessary in the best of road making, but surely there are localities in which the stone crusher, the road scraper and the plow are indispensable, and it also follows that stones, and perhaps other hardening substances will be more largely used in the future than ever before.

Highways are a sure sign of the civilization of a country, and when we stop to think of it, it seems strange that we have gone so many centuries without a better condition of highways in general. One who has visited the Holy Land tells there are few highways in Palestine, whilst in England as well as in some other European countries they are of the finest description.

In America we have all kinds of highways, and I think of no reason why we should not have *the most perfect road system* in the world. Before the time of the dawn of our American civilization when the vast continent was one great wilderness, the highway question might have been "*How shall we have roads?*" It is unfortunate for us, that in this early time our population was sparse and with insufficient plans for the best of a highway system, as well as very likely without sufficient legislative power; for I think there is too much crookedness in the divisions of our tillable lands, and too much crookedness in our divisions of States, and as a matter of course, too much crookedness in our highways. Not alone this, but owing to their actual condition we are getting aroused to the fact that we want better highways, and so I think that the question of the day so far as highways is concerned, is, "how shall we have good durable roads?" It is not for me to name the number of highway officials that shall be elected for this great work. It is not for me to tell you whether their work shall be confined to the township or whether they shall engineer for the State or the nation. But it seems to me that with one highway chief in the State of Pennsylvania, with a man who has made a *study* of the highway and who withal is a man of as high character as one I now think of, in the educational world. The best condition of highways might almost be promised throughout the State within little more than another decade.

This result can only be ensured by following good and economic methods, and whilst I shall spend no time in *prescribing* such methods, I would like to enquire, what is there to hinder us from having a great highway reaching all the way from ocean to ocean in the southern part of these United States; a similar one some where near the central part, and a similar one in the northern part of the United States.

Then with several great highways extend north and south through the United States and with other smaller highways at suitable distances extending east and west and north and south, and all of them in good condition, should not all travel be greatly facilitated? Of course this is taking the widest possible view of a highway system in the United States, and it is widely different to considering the possibly forty miles of highway managed by two supervisors in this little township. We are troubled with a higher tax than we like in our little township, and

shall we be mad enough to worry ourselves about highway making throughout these United States? Well, it has seemed to me that if we could have a straight system of highways throughout the United States, we might travel without needing to stop very often to inquire about the direction in which we are traveling.

Whatever our system of making highways, there will be taxation, and that forever. Would the State system of keeping up our highways cost us any more than our present system? Whatever system may be adopted, let us petition for just and equal taxation.

ROAD REFORM.

By S. R. DOWNING, Esq., *West Chester, Pa.*

(Read at Atglen Institute.)

"How to improve our roads," is a topic of universal interest. Of such interest that every farmers' institute should have two papers upon it. It is especially a subject of moment at this time in the year, when misnamed bogs serve as excuses for roads. As the years roll on the discussion intensifies and approaches nearer to determination and action. In fact some townships have already been enabled to dribble sufficient consent to pike a patch here and there by reason of the push of earnest discussion and opinion. We cannot easily realize that in a county so old and rich as Chester there has been such abandon and waste in the construction and care of roads. Our present bogs are evidently humiliating to any citizen who has so far outgrown self-thought as to enjoy some measure of country pride. If it has been deemed well to bridge a stream heretofore forded it seems just as well to ballast a bog or diminish the draft in an ascent. If it is a matter of cruelty to animals to abuse a horse it is in a degree cruelty to a horse for us to ignore impediments that can be removed and which are a tax upon the muscle, strength and life of a horse. Good roads not only indicate broad, intelligent citizenship, but more, the status of its actual christian growth and worth. If we are proud of our house, our farms, our horses, it is somewhat more of manhood still to be proud of our county. If we conclude that it is anything to be christian, less cruel to ourselves and our faithful horses, more favorable to that which will add to the common happiness and health, to that which will be salutary and sanitary, then, as Chester countiens we should be sufficiently proud in our citizenship, sufficiently genuine in our christianity to build solid smooth thoroughfares.

It is as much a matter of beneficence and good citizenship to stop a waste of public moneys. No rule can be found in economics that would even suggest saving at the spigot and squandering at the bung. We cannot save both at spigot and bung in road betterment without the use of material in their construction that will insure a permanently good road. A palace may be built with ice, but when summer warmth comes the palace melts away and the money that built it is lost. A road can not be built of loam or clay that will endure a single year. The average existence of such a road is from May until December. The money expended on a clay or loam road in May of every year is gone in Dec-

ember of every year. There is no better illustration of the old saying of saving at the spigot and losing at the bung than is our habit of piling clay upon clay, spending dollar upon dollar to be wasted, probably, by the first freshet.

The fact should be emphasized that no Legislature can frame, no executive sign a law that can squeeze a good and cheap road out of clay. We should know this as citizens and always be guided by such fact, because such fact involves a fixed, economic principle.

If, then, we cannot build durable roads by use of clay, and our money is wasted in the attempt, we must resort to the use of a more permanent material, either stone or gravel ballast.

Now, a stone road is not always a good road. But then a stone road can be made a permanently smooth road. A clay road cannot. To insure a permanently good road calls for extra money to begin with, a good depth of ballast, fine stone packed into a firm masonry with a surface of the smallest stone that a crusher can grind, avoiding totally the use of dirt as a surface at any and all times and under all circumstances. Mr. Cassatt was mainly instrumental in building a road from his home to Berwyn, on the Pennsylvania railroad. In building this road Mr. Cassatt gave a sort of object lesson to the citizens of Easttown township. These citizens have accepted the lesson, and the roads of that township are now being macadamized. The Cassatt road has been built for eight years, is smooth and has cost nothing for repairs. A committee appointed by a meeting of the citizens of East Goshen and adjoining townships consulted Mr. Beaumont, who built the road for Mr. Cassatt as to methods and cost of piking. Mr. Beaumont recommended for making the cheapest, best and most durable road the use of a crusher for fining stone, a traction engine and a stone car. Besides using the engine for driving the crusher, it can be made serviceable both in hauling ballast over the fresh laid road and packing it into solid, impene-trable masonry. It might be added that a crusher would supply the fine material for insuring a level surface and serve to avoid the use of dirt which under a rainfall becomes mud. The cost of crusher \$700, car boat \$140, wagon to transport crusher from place to place \$300, engine \$1,800. In certain townships, where engines are owned by private citizens for threshing purposes, no doubt such engines could be hired during eight or nine months of a year. Mr. Beaumont also estimates the cost of a road, one foot depth of stone and sixteen feet wide, at \$3,000 per mile. Some of our supervisors are convinced that a road can be macadamized right for at least a thousand dollars less. They take Mr. Beaumont's estimates of 3,500 perches of stone per mile, cost of crushing per perch fifteen cents, and cost of hauling at twenty-five cents. This really fixes the cost for macadamizing at \$1,400 per mile. They add \$600 for grading and other essentials. While Mr. Beaumont admits that stone can be crushed for fifteen cents per perch, he, with other gentlemen experienced in macadamizing, fix the cost of hauling at from fifty cents to \$1.50. They insist that the expense that varies most is the cost of hauling. If that is known, nearly all is known. As to leveling, a road machine will, with little exception serve the purpose, and with small cost.

From a gentlemen experienced in macadamizing roads our committee learned that the average cost for repairing a macadamized road does not exceed five dollars per mile. In East Goshen the annual cost of repairing mud roads per mile reaches sixty-six dollars. We have twenty miles of roads, but seven miles of these roads are little traveled and would not

require over five dollars for repairs. We have thirteen miles of main thoroughfare. Should we pike these thirteen miles we would save the difference between five dollars and sixty-six dollars and gain sixty one dollars per mile annually throughout our entire mileage, or our township would save annually \$1,220. The fact should be emphasized that this saving would continue for all time. In order to pike at once townships must be bonded. Would it not be a true business operation to do so? Evidently the sooner our roads are macadamized the sooner we stop a great waste. The sooner we stop a waste the more we save or gain. Seeing this, citizens of East and West Goshen and some adjoining townships have employed competent counsel to prepare a bill granting the privilege to each township, upon a vote of its citizens, of making a loan.

Men who have been successful in life, mainly from conservative, cautious policy and habit, say to me: "Don't go in debt," "Pay as you go." Of course, advice from such men is worthy of close consideration. It almost seems that such advice should at once be accepted because of the worthiness of its source. And yet, so far as I can really make out, this counsel seems only the essence of a dread of debt, with no scruple as to heavy taxation. A dread simply and without a conception of the advantages, in certain emergencies, of the use of capital is certainly very empty. Capital can evidently be hired advantageously. As an example, Illinois, years ago, hired an abundance of Chester county capital for her schools and for county and city improvements at once needed because at once useful and profitable. By the immediate use of eastern capital, Illinois to-day is far in advance of what she would have been had the State taken the conservative policy of waiting on the development of home resources and then paying cash. In fact, its debt was the main factor in this development of financial power. Now the counties and townships of Illinois are virtually non-dependent upon the east and this as a result of the policy of hiring capital.

These gentlemen to whom I refer admit the necessity and profit of macadamizing. They consent that our roads should be thus improved. The question then arises: Is it more costly, considering immediate advantages, early appreciation of land values, economy in the matter of time, comfort, horse power, to borrow at a long loan with slight increase of tax, or to raise the tax sufficient to pike a reasonable space every year and endure a heavy taxation? As an illustration of the last or spigot method, we would have to double our rate in East Goshen to accomplish a half-mile of macadamizing in one year. Twenty-six years would be required to pike our thirteen miles. This method would again involve twenty years of warfares as to whose thoroughfares should be piked first.

Consenting that our roads should be piked is an admission that roads not only shall be built, but that money must be expended and thus taxes increased. The burden is then after all not the loan or debt, but that of taxation. The debt is not to be dreaded so much as increase in the weight of taxation. It follows then if a long-time loan lessens the burden of taxation, besides adding the advantage of immediate and complete improvement, that business policy would surely favor the use of hired capital. Of course interest must be paid for the use of capital, but it will evidently find abundant offset in advantages and profits received.

We are met again by the question whether in justice both to the farm owners and tenants the amount of tax should not be limited to the ca-

capacity of a floating tenantry to pay? Should the heft of the burden be placed upon tenants? In fact high taxes tend to lower rents. Then if taxes must be low in order to secure good tenants and rents, both farm owners and tenants should reasonably favor an easy financial course in the matter of road improvement.

We are met again by the query, "Is it well to leave a debt to our children?" It seems to me, and probably to many, that it is less dangerous to leave a young man in debt than out of debt and with plenty money. An easy youth mostly ends in a troubled old age. You may leave a young farmer a debt incurred on account of splendid drives, but he has for his debt thoroughfares the value of which adds the equivalent of his debt to the value of his farm. If the debt is virtually wiped out by the appreciation of his farm value, he is identified with an operation that really makes him dollars and cents equal to the cost of his share of the township debt, because it appreciates his property to that extent. The township that first adopts and completes handsome, comfortable thoroughfares will be the first to attract good prices for land, an increase of population and thus new and attractive homes.

It would be far more severe upon those who may follow us to leave them a road system that would involve heavy taxation, requiring a duration of many years in which to complete an operation, with continual uncertainty as to supervisors, contention as to where piking shall be done in this year or another, involving continual loss by reason of trying to keep the large mileage not piked passable with clay or mud.

We find in our township that they who bear the brunt of taxation are owners of property along the main thoroughfares. This is evidently the case in all townships. We have in East Goshen three roads that we propose to macadamize, leading to and from West Chester, bisected by a thoroughfare known as the Boot or Chester road, and leading to Frazer station on the Pennsylvania railroad. These roads are most traveled by all citizens of our township. They lead to churches, schools, mills, post offices, stores and shops. Consequently our citizens owning property on roads little traveled, and thus not macadamized, would not be so heavily taxed as those on the main roads, but would enjoy, with little exception, the same benefit from macadamizing.

In fact, their properties, being within short access of smooth, substantial drives to West Chester or Frazer, would increase in value. So that notwithstanding they may be located a short distance from an improved road, they share in degree with others the benefits to be derived from the improvement.

A number of experiments made by Prof. J. W. Sanborn, of the Missouri Agricultural College, show that on a moist dirt road a force equal to 487 pounds was necessary to move a load of 3,665 pounds, or fifty-seven per cent. more than was needed to move the same load on a gravel road having a grade of one foot in twenty eight. On a level gravel road the force needed was only one-fourth as much as on the dirt, and on a plank floor but one-seventh as much power was required as was needed in moving the load over the dirt road. This made no allowance for energy wasted by the horse in pulling his feet from the mud and in lifting them over elevations always before them on a muddy road. These facts suggest a few calculations that may not be entirely without interest to those who have to haul loads in town or in country.

"Supposing that highways on each alternate section line be well made of solid substance at a cost of \$2,080 per mile, and that the cost

be equally divided between the sections adjoining the highways, the annual interest to be paid by each section of land at six per cent. will be \$124, or 19.5 cents per acre per year. How many loads must each farmer haul to save enough in the time and wear of men, horses, harness and wagons to equal the interest, assuming that a fair day's work should average fifteen miles of hauling and be worth three dollars per load of whatever weight could be safely hauled over dirt roads? according to the conclusion reached through the experiments mentioned, forty loads on the dirt road, twenty-seven on a well-graveled road having an incline of one foot in twenty-eight, and ten and a half loads on a level, well-graveled road would equal the interest on the above basis of \$3.00 per day. If wagons strong enough to bear the burden were used, the number of loads on smooth and level macadam might be reduced to six. The pay would practically be, for hauling loads over the several kinds of roads, equal to \$3.00 on dirt, \$4.69 on inclined graveled and \$12 on leveled graveled roads respectively per load, while on level, smooth macadam it would be equal to \$21 per load."

The main objection expressed against our bill is in that supervisors would be subject to political influence in the choice of roads that shall be macadamized, and that the tax will bear unfairly upon those distant from the improvement.

Admitting that influence might thus be used, popular sentiment would effectually demand the macadamizing of roads leading to railroad stations and our county town. Milk is shipped throughout Chester county by rail to Philadelphia. Every station on every railroad passing through our county is a milk station. Our creameries are mainly located near railroad stations. Then again, West Chester is a business and court center that every citizen must reach. It follows that the first need of any township would be a good road to its stations and to West Chester. Neither political influence or any other could draw any supervisor into macadamizing a by-road so long as such thoroughfares to railroad stations and West Chester were not improved. Evidently all influence would correctly and justly be in favor of macadamizing first the most traveled road. Amount of travel and use by the main citizenship would certainly determine the matter of precedence, or the importance of certain roads over others.

As to unequal tax burdens. In Ohio a law has been in existence near two decades permitting loans for road improvement. Authority to loan and build is given by county commissioners. Those adjoining the improvement and within a mile pay a tax of two dollars per acre; those within two miles one dollar, and so on. But a citizen of Ohio informs me that there are objections to this law. At every appeal there is evidence of dissatisfaction. This plan in many instances overlaps. Thus it results in placing an unequal burden upon those farthest from the roads that are improved. Another objection is in the fact that those properties located in a narrow point or strip between roads are encumbered to an unequal extent. So that it seems impossible to reach a hair's breadth equal adjustment of the burden of the cost of macadamizing roads.

If every hair must be equally split we may never reach the mark of present civilization in the matter of roads. The law that we seek covers what may be possible in the way of adjustment.

Properties along our main, most traveled roads are already assessed higher than those distant. These farms are liable to still higher assessments by close road improvements. Again the main roads are trav-

eled by all the citizens of a township as a rule. Our main roads are, as a rule, within easy access of all citizens. Certainly a main road from a distant township through to West Chester would be traveled rather than a series of by-roads. Again, by using a loan, taxes will not be materially raised, the saving between the repair of mud and macadamized roads virtually meeting the debt and interest. Again, the appreciation in the value of all farm property is a consideration, and still again, after the debt is paid off, mostly out of the saving as between repairing bogs and macadamized roads, we have added a money value to every acre of our farms, we have excellent, permanent roads and beyond that and for all time a deliverance from taxation, we can safely say, at a low estimate, in proportion as is fifty dollars to five. Are not such self-evident deductions proof against mistrust, suspicion and even erratic selfishness?

To effect such a grand revolution in road improvement and economy calls for unity as to the best methods and policies, for agitation, education and no spigot narrowness, calls for men of spirit who have a full and burning conception of the blessedness of smooth, safe, solid, joyous roads and the cursedness of bogs.

I am told that farmers are not equal to any effort outside of selling milk below cost of production; that the roads of Chester county stamp the impress of feebleness upon its farmers; that if they call a meeting they will fight and the soup will pass to the fire; that if they should straighten up intellectually and manfully avoid sparring over nothing, they will fall short by saving at the spigot, the old weakness, and turn out shoddy pikes.

Is this true? I think not. All that is wanted, it seems to me, is an invitation and wholesome leading. Who will lead? Who will investigate? Who will push, plead, give?

BETTER ROAD-MAKING.

By F. R. DIFFENDERFFER, Lancaster, Pa.

Bad roads in winter are not a new thing in Pennsylvania, nor in summer either, for that matter, but the past winter was so abnormally warm and wet, that all the evils of the past half century were accentuated and emphasized to a degree that has set the people of the entire Commonwealth to discussing whether there are not some means of overcoming, or of escape from, this omnipresent evil.

That bad roads are a nuisance is as generally admitted as the prevalence of original sin, but like the latter, they are so difficult to overcome, that no one knows where to begin or where the effort will land him. Good roads are not to be had for the mere asking. They cannot be extemporized at will. And when you think you have them, you awake from your dream of security to find yourself mistaken. In summer time they do pretty well, even when left to take care of themselves. A wet spell may put them into a bad condition temporarily, but the knowledge that a hot sun and dry winds will soon absorb and carry off the surplus moisture assures us, and we give the matter no further thought. Even an ordinary winter can be borne with. If the ground

is frozen or covered with snow little inconvenience is felt until the spring thaws come along, and then every one who makes use of the highways begins to think our dirt roads are a nuisance that should be abated at the earliest possible moment.

Since the Legislature has taken up this question of better roads and there is some prospect of a general law looking to an improvement, or a contemplated improvement, in this direction, the entire community seems to have aroused to the importance of the question at issue. All save a few—a very few—seem desirous that a new departure shall be taken, but right here, at the starting point, the troubles begin to present themselves. There is a class who would go to work radically and begin macadamizing. Stone roads when well built are durable, good in all weather and seasons, and entirely satisfactory. This is admitted. But they cost money, and a good deal of it, therefore, any system of road improvement that looks to building these high priced road beds is received with anything but favor. A good turnpike will cost anywhere from \$1,200 to \$2,000 per mile to build. Some townships in this county of Lancaster have as many as 400 miles of laid out public roads. It is manifestly impossible to pike all these, even through a long series of years, without largely increasing the taxes in some shape or another. If the Legislature could be induced to tax corporations, stocks, money in the hands of capitalists, and allow the farmers to go free, then I think every farmer in the State would favor the building of turnpikes. But this scheme is not likely to be carried into effect. The farmers as a class use the roads more than any people in the community, and it seems simple justice that they should pay their full share of the cost. With most, I believe, this settles the case against turnpikes at the present time.

Issuing township bonds running through a considerable series of years is proposed. This would lessen the immediate burden, it is true, but township bonds, like all other forms of indebtedness, must at last be met. But even if that plan were to be resorted to, is it to be supposed that a township could afford to bind itself for four or five hundred thousand dollars? True, all this indebtedness would not be incurred at once, neither would all the road be built at once, and here comes in another fruitful source of objections. Suppose a township resolves on a system of stone roads; which of its hundreds of miles shall be built first? As all the tax-payers are taxed alike, each one would think himself entitled to have the new road near his own premises. In this respect every man's claim is just as good as every other man's, and yet it is no more possible to oblige everybody in this particular than it is for two men who are on one horse to both ride in front. I think I see an endless source of dissatisfaction, discord and complaint right here, which it is impossible to overcome.

STATE AID.

Another point suggests itself. If these stone roads were resolved upon through the medium of State aid, might not injustice be done to perhaps nearly one-half our entire population. The people of Philadelphia, for example, pay a certain municipal tax rate, a very large share of which goes to paving the streets of that city. A State appropriation would compel those people to contribute to pike roads in the extreme corners in the State which they will never see, never use, and in which they have no interest whatever. I think they might rightly complain of the injustice of such a law. Farmers talk of State aid as perhaps the best

way to solve this problem, but under the existing tax law would they be so greatly benefited? Would not an appropriation of a million or two coming out of the State treasury result in the additional taxes they so much dread? Would they not first have to put it in the coffers of the Commonwealth before they could get it out? Would they not have to pay out this very money they build on getting to make their roads? Of course, they expect outsiders to make up this sum for them, but is it exactly fair in them to insist that men who never use their roads shall pay for making them while they, the most nearly interested, shall escape almost entirely?

STATE OFFICIALS.

It has been suggested that officials appointed by the State shall be intrusted with the making of the roads. That some one in authority should be at the head of the road department is conceded, but is it required that he shall be a State officer? He would become the ruler and arbiter, and townships might in the end find his presence over them distasteful and oppressive. It is far easier to invite such a yoke than to cast it off when it becomes burdensome.

COUNTY ENGINEER.

Inasmuch as I conceive that one-half of the evil of bad roads results from the incompetency of the supervisors, I am persuaded that the first step towards better highways is the selection and appointment of a county road engineer, one who understands the theory and practice of road building in all their various forms; one who should pass from township to township continually, except in winter, when road making is impossible, and lay out the work for the Supervisor. He could be a most important factor in the good work and be worth all he costs.

TOWNSHIP SUPERVISORS.

If the truth must be told, we owe our bad roads quite as much to the incompetency of our supervisors as we do to the work of the elements. How many supervisors are there in Pennsylvania to-day who have a professional knowledge of the art they are trying to practice? In no other business practiced among men is a man made a foreman to superintend the construction of a piece of difficult mechanism without first having served an apprenticeship himself. And yet this is almost the invariable rule among us. Is it not a little unreasonable to look for satisfactory results from such a course? And does it not appear reasonable that right here the first step in reform should be taken? Supervisors should be educated in their work. There are practical works on road building and every supervisor should by law be compelled to provide himself with some approved book of this kind, selected by the county engineer or superintendent already spoken of, and be required to make himself master of its contents.

THE PRESENT LAW.

The defects of the present law are so notorious that every one knows them. Seemingly, the privilege of working out one's road tax is greatly to the farmer's advantage. It is true, he pays his tax easily, but in the end it is a costly piece of business. It is not necessary that I shall recall or comment upon the motley crowd that presents itself to the

supervisor in accordance with his notification to be on hand on the appointed day. It looks as if the cradle and the grave had been robbed to supply the requisite numbers. We all know how it is, for we have all been there. How severe and exhausting the work every man and boy does is equally well known. The sides of the road are plowed deeply and the dirt thrown up is dumped on the middle of the road. That done, the work is commonly finished until the following spring, when the supervisor's invitations to his annual pic-nic are again sent out. And then, how do these people earn their wages. A few there may be whose consciences are somewhat less elastic than india-rubber, and who really do an honest day's work, but how about the great majority? I need not dwell further on this phase of the question because we all understand it; and yet the man who lolls on his shovel-handle through the long spring day gets as much pay as he who has wrought an honest day's work. It is true, the supervisor has authority to pay every one what he believes he really earned, but does he do it? Not a bit of it, he dares not do it. He would soon find his situation so hot, that if he did not give it up voluntarily, he would quickly find himself out of a job through the influence of the men whom he docked. Who has ever heard of a supervisor who availed himself of this prerogative and has been allowed to keep his place?

WHERE WE OUGHT TO DO BETTER.

Every man who has visited Europe is loud in his praises of the roads over there. In fact, they have no bad roads there at all. You can travel for days over English or French roads without encountering a breaker. Here one is in good luck if he does not meet more than one in every hundred yards. There is no reason why we should have these abominations in this country. We can get along without them just as well as they do over there. We have them because our supervisors don't understand their business. We are the heirs of a vicious system and have never tried to cast away the inheritance. We need some one to show us how to do without them. Then, too, there is no earthly use for the deep ditches on each side of our roads. The road should be well rounded at the top and slope very gradually towards both sides without ditches at all, or, rather, the lowest part of the road itself would be the drainage channel and carry off the surface water. As things are now, it is often dangerous for a top heavy wagon to approach the sides of the road lest it topple over. A wagon ought to be able to approach the extreme outward edge of the road easily and without danger. There can be nothing more useless as well as unsightly than the deep ditches now everywhere encountered.

A BETTER WAY.

Abolish the privilege of paying the road tax in labor. Pay the hard cash into the supervisor's hands. When that is done he will at once find himself in shape to do better and more effective work. He soon gets to know the good workers in a locality. These he will secure and no one dares question the fact that a dozen of these will prove more effective and prove cheaper than the two score men and boys miscellaneously gathered to work out their road taxes. I, of course, go upon the supposition that the township owns a road scraper and the other apparatus required in road making. If this plan were pursued, three

times as much road could be made with the same amount of money, and be better made too.

SUMMARY.

But this subject is so long and so broad that we could write an entire volume about it without exhausting it, or even giving all the essential points. I will briefly summarize the points which I conceive have an important bearing on the question of providing the people of this Commonwealth with better roads at a cost as low or not much exceeding that levied under the present law; for say what we will, this matter of cost is one which must be constantly kept before us.

1. A law authorizing the appointment of an engineer, who must be a practical road builder, who shall exercise general superintendence over the roads of a county. Such a man's services might not be procurable on easy terms, but here, as everywhere else, the best man would also be the cheapest.

2. Greater care in the selection of supervisors. I am not sure whether it would not be a good idea to compel him to undergo an examination by the county engineer to decide upon his competency. He should certainly be compelled to procure and study some approved work on road making, and be able to pass an examination upon it. The salary of a supervisor should be large enough to enable him to give as much time to his duties as shall be necessary, and not he but the county engineer ought to be the judge of that.

3. An act compelling the payment of road taxes, not in labor, but in money. Thrice the amount of work could be done in this way. I believe that a judicious expenditure of the money now levied in the shape of road tax will give us not only infinitely better roads, but when placed in the hands of competent supervisors, roads that will prove satisfactory to the traveling community nine months in every year.

4. It is not enough that a supervisor shall go over his district once every year, in the spring months, but whenever the road is in bad condition, let it be in April, July or November. Herein, in fact, I conceive lies the great secret of good roads. Suppose a road to have been newly and well made. Sooner or later rains and use will produce ruts of greater or less depth. These should at once be filled. If water is allowed to stand in them, every vehicle that passes will cut deeper and augment the evil. If the necessary repairs are made at once, the cost will be a trifle. Two or three men can repair all such trifling defects over miles of road in a single day. In fact, here as in a thousand other places and cases, eternal vigilance is the only safe-guard. Nowhere does the early stitch save the large rent so easily and cheaply as in this. If supervisors were paid adequate salaries, they could afford to do this; in fact, where the district is large, he could perhaps put all this time in on this work. The more he put in, the better his roads would be.

5. I do not believe it prudent for the State to make an appropriation to assist in road building. It would in no wise lessen the burden of taxation, and if devoted to macadam roads, would amount to very little after all to each township.

ROAD LAWS.

By WELLINGTON SMITH, *Mifflintown, Pa.*

Roads are an outgrowth of civilization. The more civilized and enlightened a nation, the more nearly does its system of roads approach perfection. Any age or nation is best understood by the character of its roads. If they have no road at all, they are savages. The Romans were about the best ancient road builders, and among the best in modern days are those of the English, French and Germans. Sharp competition in trade with lack of railroads render good roads a prime necessity. It is said a farm two miles from market over a bad road is farther off than one four miles off and over a good road. Nature of soil with local characteristics have much to do with the cost of construction, and hence quality of roads, but it is with nations as with individuals "where there is a will there is a way." In cities, we may say, roads are perfect, in larger towns less so, in smaller ones still less and in rural farming districts we find them hardly tolerable, and reaching out into remotest districts, we have the "hedges, chuck-holes and boulders." The roads corresponding exactly to the degree of civilized progress. And the difference is less esthetic than utilitarian. Good roads shorten distance. They save wear and tear. They save horses. They add to the value of real estate. They multiply business. Proximity is synonymous with monopoly in business. The writer can get two cents more per bushel for wheat by hauling two miles farther and can draw forty bushels with two horses. This would be eighty cents more, but loss of time, wear and tear arising from bad roads is so great, the eighty cents are no inducement. And even the fact that lumber is usually from fifty cents to a dollar less at the same place is not a sufficient set-off against half-civilized roads. Only good roads are true economy.

The road law of our great grandfathers is really worn out—it must go. Its fate is sealed—we read it in every paper and hear it in the very wind. We must "lay down de shovel and de hoe." During the past wet season the best of our bad roads became utterly intolerable public highways, so that now both law and roads are "all worn out together." Just how to proceed to reconstruct is "information wanted." Any wet season demonstrates that mud roads constructed with the road scraper are not lasting roads. In a dry season, by-roads, and such as are not frequently used, when well rounded up with the machine and thoroughly drained, will do well enough and *may* pay for the labor of making them, but all *main* or *central* roads ought to be well piked or macadamized. Upon this point there can be no difference of opinion. At this trying season, wherever a few rods of even the most imperfect piking had been done the roads are passable, and notably the old turnpike leading from Lewistown to Harrisburg, &c., though abandoned for over thirty years and receiving no repairs beyond a little gravelling to smooth up rough places, was, this extraordinary season, the best road in the county. Even our flint hill roads, heretofore so famous for their compactness and generally good qualities had the "bottom fall out of them" and were little better than our machine mud roads. Satisfied that piking or macadam roads are the only ones to be recommended, we

proceed to consider cost, plan and how to be carried out. It is plain that under the present law no system can give relief no matter what amount is expended. It allows the election of any one regardless of qualification. It does not specify *how* roads are to be made. It, therefore, confers too much discretionary power. Every supervisor has his own ideal standard. There is no concert of action from year to year. If one does good work his successor should begin where the former left off. The law demands but one thing, and in a very indefinite way too, that a road must be passable. And no road is ever impassable unless a tree falls over it. Supervisors have been returned for neglect of duty, but are never convicted. If the road is passable he has faithfully performed his duty, hence, no permanent work. Fully one-half of all the time and money now spent upon *our* roads are lost. A road law should be definite in regard to system, qualification and execution. If road tax were paid in money, the tax-payer would see to it that the roads get the benefit of it. When paid in work, what is everybody's business is nobody's business. Many never work out their tax. It is simply canceled. If township auditors were vested with power to direct and *inspect* work so far as permanent improvement is designed, levy the tax for it, leaving temporary repairs and minor details to the discretion of the supervisor as it now is, the standard of qualification in this office would at once be raised to a higher plane. Auditors would direct, for instance, that at a fixed point on road A, 300 yards of piking is to be done, twelve feet wide, ten inches high at the sides and fifteen inches deep in the middle and graveled over the top, &c. A similar pike on road B, and one on road C, &c., to be completed by the first of August. The auditors will inspect the work, and if it is found to come up to the specification, the supervisor will be credited with so much work done and paid, or allow a credit on work tax, &c., as the case may be. This plan would be efficient and economical. No law can be made specifying how roads over the State must or can be made. Circumstances alter cases so. But auditors who are residents in the place know all the conditions and can *direct* accordingly. It is clear if tax were paid in money our roads would be made cheaper and more rapidly. Auditors would be a party to fix the price of labor, teams and material and levy the tax. After one year's trial farmers would have nothing else. Few are ready to go to work on the roads at any time. Much of his work cannot be postponed without much sacrifice, and for just this reason roads are poorly made or not at all. But should the farmer bear the whole burden of making the roads. He should not, and to compel him to do it, is to distress him. Everybody is interested in good roads, rich and poor alike, those that ride and those that walk, for all have to use them. A universal benefit is that of good roads. Then why exempt any, or any property? Those not owning property should pay two dollars poll tax, and all property now not taxed at all or for State purposes only, should bear a three mill road tax. State aid could also be rendered similar to that now given for school purposes. In this way a sufficiently large revenue could be derived so that the mill rate for road tax by the farmer could be reduced from eight to four. This the farmer could pay in money and not be much distressed when we consider that all his taxes would then foot up only about sixteen mills on an average. Some could find time to do hauling and be employed on the road at intervals and earn still as much or more as they pay over and find the money plan a great advantage. Being hired to work for fixed wages the township would get better work and more of it.

We conclude, therefore, that the old or present road law has outlived its usefulness, and everybody is anxious to lay it to rest. A moderate amount of permanent roads ought to be made each year, and piking or macadamizing where practicable, is the best system must, be sternly enforced and this implies plans and specifications, and these in turn imply inspection of work when completed. One body of officers, say township auditors, should examine the roads, main or through roads first of all, mark the place where work is to be done, specify *what* and *how* to be done, levy a tax to pay it, require its completion within a fixed time, and then inspect the work when completed, and if satisfactorily done, take it off the roadmaster's hands and pay him for it. The roadmaster in the meantime is to do temporary work over the township as may be necessary until permanent work supersedes it. That to require the farmer to do all this is unjust and burdensome, and that taxation for road purposes could and should be extended to all kinds of property, and in addition to this, State aid should be given for a limited time not less than five years. A poll tax of two dollars to be paid by all non-holders of property. That this would give such relief to the real estate holders that farmers could pay their road tax in money instead of work, and in this there would be mutual benefit to township and tax-payer. Where road tax is worked out, a failure to work after two days notice shall be sufficient cause to forfeit half or the whole of the individuals tax at the option of the roadmaster.

THE WRONGS OF THE ROAD LAW AND THEIR REMEDIES.

By JAMES A. REBERT, *Cashtown, Pa.*

(Read at Bendersville Institute.)

There is now a commission, appointed by our last Legislature, whose duty it is to frame a bill to be presented to our next Legislature to take action on, for the purpose of remodeling our code of road laws, which, as a rule, were framed in the early years of the formation of our State. At that time townships were as large, (or nearly so) as our counties of to-day, and what then suited the needs of the people, has survived its usefulness and become burdensome to them without reasonable benefits.

In the formation of the laws in the earlier days of this Commonwealth the majority of the Legislature were practical men, men who knew what was needed in the different parts of the State, but with the advance the State has made in education, population, manufactures and agriculture they are entirely wrong.

Through the progress of education, the making of our laws has fallen into the hands of professional men, men that in an agricultural direction as a rule, make laws from theory (or in other words book learning.) They lack the art of practicability, and practicability you all know makes better roads than theory. They may know when a road is bad, but how to make laws to remedy it is something else.

The first wrong I will treat of is that the geographical features of this State are such that a general road law would be burdensome and wrong.

The second is the manner of laying out public roads and the manner of laying damages.

The third is the assessing of taxes by individual townships and compelling each to keep their individual road in repair.

The fourth is the law allowing farmers to work out their road tax, really one of the greatest wrongs of all.

These are a few of the principal wrongs. There are many others that could be mentioned, but I will not take your valuable time.

In answer to the first wrong, a general State law would be passed, only so far as to the manner of laying out of roads, the assessing of benefits and allowing damages; the construction of bridges, the condition roads should be kept in, the duties of supervisors, the penalties for counties in not keeping their roads and bridges in proper repairs from which accidents may result.

The geographical situations of the different counties in this State, their topographical features, and their general needs are so widely different, that general laws made to suit all would, by their excessive length, be unwieldy and of no real benefit.

Outside of the main points designated above, the making of roads should be in the hands of the county commissioners, or a board of road directors, who would be supposed to know more about the roads and the needs of the country, and what is necessary for good roads than a Legislature composed of two hundred men scattered all over the State, no matter how much education and thory they may have.

Let the Legislature say in its laws what the State wants in roads, and the commissioners use their judgment in giving the State what she wants, which I think would be the best.

In answer to the second wrong, you all know that every man to be just, should be willing to allow his neighbor the same that he would ask.

What right justly, has a man to buy a farm that is situated, say, two or three miles from a public road, and reached by a private road, and a bad one at that, which would if passed by a good public road be worth twenty to twenty-five per cent. more, and then ask the township to make him a public road, probably to the detriment of a number of other farmers who are satisfied and will have to go to a great expense in widening and fencing, or probably making all new, for which they receive but nominal damages for their labor, expense and inconveniences, and he pay nothing for the increase of his property. He knew the disadvantages in roads when he bought, and bought at a price in proportion to the same. Every man should pay for the benefits derived by a new road, and every one damaged should be paid in proportion to the same.

Another point is the appointing of viewers from a distance. Why not take men of judgment from the immediate vicinity who are not interested in the same, as they would, I think, be more competent to pass judgment on benefits and damages. If farmers must have roads, that is new roads, laid out for their individual benefit, they should, in their construction, bear their beneficial share of that construction. This burden should not all be put on their neighbors. It is enough if the township bears the expense of keeping the road in repair, which, I think is right. Every person should be treated equally in a county. We should be as one family; no favorites; all should have good roads.

In answer to the third wrong I would suggest that the county com-

missioners should lay the road tax the same as all other taxes, for several reasons, viz: First, the tax could be collected for less than half the expense. Secondly, the county should pay for keeping the roads in repair equally, and not each township keep or repair its own roads.

The geographical situation of the townships are not nearly all the same. The county town is generally centrally located and as a natural course of events, business will centre there. Or the county may have other large towns that will magnetize trade in their direction, and naturally the townships immediately surrounding these places will take more labor and expense to keep its roads in repair, than townships more remote, and they do not help pay any of the burden put on them and are always ready to censure their neighboring townships through which they travel, for not keeping their roads in better repair.

Again, townships like Franklin and others, are in a much worse position. Farmers in the more arable townships, as a rule, have tracts of timber land on the mountains and cause more expense to the township than all the other uses the road is put to. The season they most use our roads, is when it is too wet to labor on the farm. If it is too wet to plow, it is not too wet to go to the mountain for rails posts or other lumber of some kind. Their employes must be kept at labor if it must be at other persons and the township expense. During the spring, when the frost is leaving the ground and the roads are loose and spongy, is mostly the time such hauling done. The roads are cut up and damaged more than the whole balance of the year's use, and the township must bear the burden of expense in repairing, which was mostly caused by persons who pay but a few cents tax on their few acres of land and they mostly ready to complain that their land is worth nothing and taxed by the township entirely too high, when the damage by one such farmer causes the township more expense in one year than all the land is worth. Why should not the county lay the tax and the supervisors who are elected be under the control, and the tax be apportioned in proportion to the number of miles of road and the needs of the same. You all know that arable townships are more valuable than the same would be along mountain ranges and they are the ones needing the timber from the mountains. Would it not be more just if they would help to keep the roads in repair. The citizens of a county should justly help to bear each others burdens in respect to its government, and I would say here that its public schools should be supported in the same way.

In answer to the fourth suggestion of wrong, the greatest of all the wrongs, the farmers and others working to cancel their tax.

It is so much like the man and his wife starting a hotel in a sparsely settled country. The stock in trade is a barrel of whisky and a shilling. The landlord keeping the hotel while his wife spends the shilling. Then she keeps the hotel while he does the same. The results are the barrel gets empty but the shilling still remains. So with the bad roads, at the end of the year the taxes are gone, but the bad roads still remain.

There are many reasons against tax being worked out, and not one good, honest, unprejudiced reason in its favor. As the law now is, if I understand it rightly, every farmer or other person must have a chance to work on the road in lieu of his tax, and no statute or law telling the time such is to be done, so they do so when it suits them. Do farmers as a rule, respond, if called on to work, if their soil is in such condition that they can prepare it for sowing oats, planting corn, or at any other time during the year when they can labor on the farm? No, of course

not. But if a wet spell sets in and their soil becomes so wet for a few days so that it would be injurious to their soil or crops to work on the farm, then of course, they are ready for the roads, only to do probably more damage than good. When it is too wet to labor on the farm, it is the same for the roads.

Then, again, it can be seen by the number of supervisors demanded in the different townships, so they can get their work for the taxes done at such times that they cannot labor on the farm.

Again, it is but a machine to tumble politics in, and its being a political machine can be explained very easily. Most of the supervisors, especially in townships with heavy majorities, are politically handicapped, people as a rule working on the road do not care, as it is only for taxes and take advantage of the same. The supervisors dare say nothing, if they try to make the laborers give the township justice, they are threatened with a "downing" at the next election, and of course he becomes useless to the township unless they persist, and then the threats will be carried into effect, and new men elected that are more pliable. Rotation in supervisors is not beneficial if you have good, honest, capable men as such, but under the present law they cannot be so and be of use to the township for more than one year.

If the supervisors had the tax at their disposal they could hire men to do the work on the roads, men who knowing that they had a job of work for the season in sight, would give the township justice to keep their place. If not the supervisors could hire others who would. Men are not all dishonest.

Under such circumstances one day's work would be worth a number done by men that only work to get rid of paying their cash, for the reason it would be done at such times that their work would be of some benefit to the roads.

How much can be expected of mechanics, men that do very little labor of any kind, or even farmers that are not accustomed to the use of the pick and shovel? As an illustration allow me, if you please, to cite a shoemaker. He may have a dollar or two road tax to pay and is called on by the supervisor. At the time he may not be very thronged with work; may think others work out their tax, why may he not do the same. How much can he do, no matter how honest he may be and how desirous to give the township an equivalent for his dues to the same.

I have known men who have retired from active life with a competence, men who had passed the meridian of life, who had a few or more dollars road tax to pay, go at the call of the roadmaster only to lean on their shovel and keep others from work. They had wealth and political influence at their backs, and, of course, the supervisor dared not say anything as the election was coming around. He dared not insult him and thereby lost his usefulness.

The supervisor is as a rule tied hand and foot, but with the tax at his disposal he could give the roads justice and would or could be independent of politics, as his proficiency in making roads would be the stepping-stone to his next election and he would not be purchasable by either of the political parties.

Now that the State is taking steps towards remodeling the road laws, it is the duty of every county in the State to hold meetings and discuss the best manner of keeping their roads in repair, at the same time keeping the tax-payers interests in view. Also to send such information through resolutions, &c., that might be of much benefit to the commission in their work. They may be men competent for their duties, &c.;

know what is needed in their respective districts, but know nothing of Adams, its roads, their condition and what would be needed to make them as they ought to be.

Having taken up too much of your time I will close, hoping that something said in this article may lead this institute to take up and discuss the wrongs of our road laws, so that it will bring out suggestions and arguments that will explain what are remedies and how to make them. Every one should take an interest, as now is their opportunity, before the Legislature acts, as it will be too late then. Men expecting to be candidates for the next Legislature, should be more especially interested in these meetings, so they, in case of election, will know what their constituents want and thereby vote and talk more intelligently on the subject, and be of some benefit to the county, not mere block-heads or figures of wood and of no more use than the curl in a pig's tail and much less ornamental, fit only to ride to and from and draw their pay.

It is generally the people's fault that laws do not suit them. They never take any interest in anything until after the effects reach them and their ox gets gored. Then they howl. If they had taken an interest in such things at the proper time, as they now have the chance to do, results in many of our laws might be quite different, if not it would not be their fault and they would have done their duty. You should encourage your Representatives all you possibly can in the way of information concerning the need of your several districts in regard to your roads, and what would be beneficial to both the roads and the tax-payer, so they could labor more to your interests.

Farmers, tax-payers and members of this institute, with you lies the work, or at least part of it, in the formation of laws that will give us good roads in the future.

PUBLIC ROADS.

By BAXTER McCLURE, Esq., Bath, Pa.

(Read at Bath Institute.)

No nation in the world has made such progress in arts, manufactures, railroads, telegraph lines, public education and general civilization in the past century, as our free and united Columbia; and of that grand collection, that compose this Union, we proudly cling with loyalty to our own "Old Keystone State."

Her prosperity is founded on mountains of iron, coal, limestone and slate, with other minerals in great variety; on wooded hills and fertile valleys, to all of which may be added petroleum and natural gas sufficient to light both hemispheres.

Her capitalists are mostly enterprising manufacturers, employing thousands of their fellow men, whether skilled or otherwise, and distributing of their wealth among them.

Her statesmen and rulers are wise and judicious, looking well to her interests both foreign and domestic. Her professors and teachers eminently learned and eager to impart the knowledge they possess to every one within their reach.

Her clergy scholarly, faithful and earnest in the discharge of their high calling.

Her farmers! "*The noblest Romans of them all*," are under Providence, the *acknowledged force*, the main spring to set this grand combination in motion and maintain it in successful working condition. When farmers are prosperous and happy, the result is apparent in every department of trade and commerce.

They possess the power of making the laws of the Commonwealth and of electing the rules to execute them, beyond the possibility of any other class or occupation in the State, and yet too often they leave legislation to lawyers and politicians and spend their days and strength in an unequal contest for success, because weighted down with inconsistencies of laws and customs that make them "hewers of wood and drawers of water," for their more crafty brethren.

Of the many public improvements in which the farmer should have great interest and for the condition of which he is (however unjustly) held chiefly responsible, are the highways of the country; the public roads of his particular county and township.

But we find our farmers to be long suffering, patient, easy going, plodders even to the neglect of their own best interests in this matter.

To them, (more than any other class) is usually given the right to decide if new roads shall be granted, and where shall be their location? and yet how often they permit roads to be multiplied needlessly, for the sake of a friend or neighbor, and to be laid over the highest hills or lowest depressions regardless of cost of maintenance or easy travel. The laws governing the subject are acknowledged to be vague, indefinite and defective.

From a variety of causes, such as imperfect construction, clayey soil, lack of proper drainage and an extraordinary annual rain fall, our roads have become *highways of destruction* and *sloughs of mud*, to be shunned by man and beast.

The people are now becoming aroused and are anxiously looking for a remedy.

You are all, perhaps, aware that an act was passed by our last Legislature, appointing a *commission* to give this subject their serious attention, and to prepare a bill to be submitted to the next Legislature which shall embrace the needed changes in our present road laws, and such suggestions and improvements as shall in their judgment be wise and expedient.

We have great confidence in the ability of the gentlemen composing that body, and have no doubt they will discuss and dispose of this question with credit to themselves, satisfaction to the appointing power, and relief to the public. In the meantime each one of us has a duty to perform looking to the same end.

We can, by friendly discussion, and careful study of the subject, gain a better understanding of it and be able to recognize a *good and wholesome* road law if our eyes are ever permitted to behold it.

We can in our own townships, have useless roads vacated, crooked ones straightened and where possible, avoid steep grades by going around hills rather than over them.

That a public road should be the shortest line to a desired point, consistent of course, with serious obstructions, is economy for the tax-payer and pleasure to the traveller.

To accomplish this might be a first step towards improvement, for many rods of road are now traveled which are really unnecessary.

Then we should not lose sight of the fact, that *good roads* are a positive benefit to the farmer, the miller, the merchant, the manufacturer, and indeed to every class and condition of mankind who have occasion to use them.

The owner of a farm on the line of an improved highway, is likely to display a pardonable pride in the improvement of his land, cultivation of his crops, repair of fences, destruction of weeds, and in the substantial and attractive appearance of his buildings; and it is a noteworthy fact, that such improvements judiciously made pay well for their cost.

He is then able to market his productions at any season of the year at the minimum expense for wear and tear, whereas, we know in our own vicinity that during the present fall and winter, many were prevented by the condition of the roads from reaching the market, most profitable for them.

The same cause acts directly on our merchants, for by the absence of teams in the village and a decrease of sales from the counties, they realize that something prevents their customers from coming to see them, which cause, after all, generally means *bad roads*.

We therefore declare *bad roads* to be injurious to the prosperity of any community and a *nuisance* that ought to be abated.

But the farmer will not be expected to do this alone. He must be assisted by every trade and profession in the State, for all are affected by the result. In some localities the hauling to and from furnaces, forges, mines and quarries, does more injury to a clay road than all other traffic combined.

Their heavy laden, narrow-tired wagons, attended often by dull and reckless drivers, never leave a beaten track till they find by experience their team can no longer drag the load through it, then for a change proceed to cut two more ditches in like manner, until from bad to worse the road becomes a *terror*, not only to *evil doers*, but also to *they who do well*. A road cut through in that manner for successive years, and necessarily compounded with soil and decaying vegetable matter, never recovers its original compactness, but is again easily broken through by traffic in a wet season.

For the repair of such roads, we claim heroic treatment is demanded, and under existing laws and customs that is not easily accomplished.

In harmony with our present law, we elect two supervisors in each township for one year, and by dividing the township into two districts, each of them is responsible for the management of the roads of his own district.

After the election which occurs in February, he is supposed to go into winter quarters, (as an officer) until he has sown his oats and planted corn and potatoes, then if shade trees are well advanced in leaf, and the roads fairly leveled with constant travel, he marches forth to invite his constituents to meet him, *week after next, over by McGinty's*, at eight o'clock in the morning to *make roads*.

From the company who respond to his notice, it is seldom that more than one half of the number are able and willing to do such a day's work as would be expected and required by an employé in his own interests.

Through the course of the day a mile or more of road will probably be *gone over*, and in *some cases* positive improvement made, but alas! too often heavy deposits of soil, sods and stones are put where nothing is needed, and the *mended* part of that road made worse than it was originally, and the supervisor unconscious of his error, wends his way home to recuperate his wasted energies and enjoy the peaceful slumbers of the innocent.

The result of such stupidity is seen in wrecked vehicles, disabled horses, angry drivers, and worse than all, *curses* loud and deep on the author of the trouble.

A heavy loaded land roller drawn by two or more horses, is as necessary and effective an article for compacting a *newly made* road and making it fit for travel as, any at present available for the rural districts.

The first wagons to travel a newly made road naturally select the smoothest and solidest part for their track, regardless of whether it be in the centre or on the verge of the road, and like inferior animals, succeeding drivers follow the leader, consequently, where the middle of the road is left rough and uneven and the sides scraped smooth and solid, the centre is shunned and travel on the sides soon fill up the water courses and the road soon becomes unfit for travel.

If, however, the roller is faithfully applied (not once or twice,) but as often as necessary to perfect the work, travel will naturally seek the middle of the road at the outset, putting the wear on just that part of the road-bed where it will do least injury.

There is probably more money spent every year in repairing or renewing broken springs on business and pleasure wagons in our districts than would pay for the use of a roller on every road in the township.

Then again *one* inspection of the roads by the supervisor in the spring is not sufficient to inform him of their condition during the entire season, (unless he be super-natural) which we are loath to admit.

I believe I have in memory more than one supervisor who was a stranger to miles of road in his district from the middle of May till such time in the winter following as he wished to collect and settle the tax.

Notable exceptions, however, were in order sometimes, through an official notice from an impatient traveller or justice of the peace.

We claim that clay roads should be repaired whenever they become unfit for travel, even if that requires the attention of the supervisor three, four or more times in the year, but we are well aware he does not so interpret his duty. By using a road scraper and roller in the month of April, great relief might often be given to the travelling public with a small outlay for expense, the roads being still mellow from frost, respond easily to the scraper, the winter ruts are filled, leaving the completion of work till later in the season.

We earnestly plead for more care and attention to the main roads of the country.

They lead to and from populous boroughs and cities, through highly improved farms near the homes of thrifty and intelligent people.

Their improvement is for the best interests of every tax-payer and perhaps every resident of the county, and though it may prove expensive and troublesome, I am convinced that it is worthy of our best efforts.

From the present outlook we are not prepared to adopt the Telford-McAdam system of road making for many years, except in rare instance and in a moderate degree, however much we may desire it.

By revising our present road law, we might place the subject on the same footing as public education, or the common school system.

Let us elect six, clear-headed, public spirited directors in each township for three years, electing two each year, to serve without salary, who shall have authority to declare when and how roads shall be made and repaired, and employ men to do the work under a competent superintendent.

Let all road taxes be paid to these directors and disbursed by them.

Let the State make an annual appropriation to each county in the same manner as is now done with the school fund. Such appropriation to be made, only on condition that a like amount has been expended by the district in making an approved, permanent road-way of a specified length. Let us gather up the *unemployed tramp element* and *compel them* to earn an honest living by the use of a stone hammer and shovel, and the robust element, in our county jail, might well be employed in the same manner.

When we can see the way clear to large appropriations and liberal expenditures, steam rollers and stone crushers will no doubt be substituted.

Till then we must "make haste slowly." As to their utility for boroughs and cities there is no longer any question, but *the cost of the plant*, and the subsequent expense of the system, are the weighty objections, that will probably prevent their general adoption in the rural districts for the present. And now in conclusion: let me urge the citizens of Northampton county to give this subject the attention its importance demands. We may not be able to accomplish all we desire, in our own day, yet we may make the best possible use of our opportunities, as they are presented, and by raising the standard leads to a system of better highways for future generations.

ROADS AND ROAD-MAKING.

By W. H. H. RIDDLE, *Member from Butler, Butler, Pa.*

The criterion by which McCauley, the historian, judged of the civilization of a people was the condition of their public highways. Tried by such an estimate, this country would be relegated to the gloom of the darkest ages. Like attendance on the funeral of a friend, it is a "melancholly pleasure," to write of a condition of things, which even ages of ignorance and superstition condemned in their estimate of civilization, as existing in this wonderful age of progress. Rome with her uncultivated civilization, several centuries before the beginning of the Christian Era, was not without a shining example of an imperishable highway, constructed over a country of rocks, swamps and valleys, which required the knowledge of the skillful practical engineer, as well as the expenditure of vast sums of money and the labor of vast armies of men to build its famous "Appian Way," which led direct to Rome, as all of its roads are said to have done. And whether climatic forces are more favorable or their mechanism more durable, Roman roads exist to-day in a good state of preservation. So history informs us, notwithstanding the storms and uses of two thousand years, to which they have been subjected. After the conquest of Peru, Pizarro, its Conqueror, found roads of wonderful construction, notably one from Cuzco to Chili, a distance of 2,000 miles, the makers of which were neither discouraged with the rugged and elevated surface over which it passed, the rocks of granite on its course, deep ravines, rugged streams nor all else made so formidable in the topography of a mountainous country.

Napoleon, in the beginning of the last century, in the construction of

his celebrated pass over the Alps, from France into Italy, affords an example of what determined energy and ceaseless labor can do in road construction where all nature seemed to have combined her forces against him. Some excuse for our failure to be able to vie with the famous "Ways" to which we have referred may be found in the fact that Great Britain, fifty years ago, could not have furnished to the philanthropic, Mr. Carnaegie, the splendid public highway of which he speaks in his "Four in Hand."

As "doubt and debate" are said by an eminent writer to be the "safety valves of freedom," their exercise on the question of roads and road-making will doubtless cause some good results. The education of the people can be more effectually brought about by a comparison of ideas based upon experiences of past ages, than the acceptance of theories untried. Railroads have seemingly absorbed all the interest in the matter of travel, so rapidly have they been constructed of recent years. But as the country is now so well provided with facilities for this mode of travel, it is well for us to look to the improvement of our common roads. Accepting it as a historical fact that highways of durability have been constructed over great distances, in ages when engineering skill had not attained the high standard of perfection of more modern times, and materials used in the construction could not be so readily handled, and when labor saving machines were comparatively unknown, why is it that with all the progress of modern times in every branch of industry, in the arts and sciences, the people of a great State like Pennsylvania are complaining of the almost impassable condition of the highways, doubtless because of the wonderful interest her people have manifested in the building of railroads. Much as their construction have added to the development of the resources of the Commonwealth, the fact that her public highways are so much inferior to all other public improvements, seems to be the result of this over-growth in the matter of railroad construction. It has of late seemingly become apparent to all that our roads must be improved.

It is suggested that the road laws of the State be compiled or rearranged, as a means of bringing about a better condition of our roads. New enactments are doubtless needed, and will certainly be made in the near future, one of which ought to be the compelling of every taxpayer to pay his road tax in cash. The useless method of allowing men and boys to "stand out" the road tax, assessed for the repairing of roads, under the direction of a supervisor, who is elected simply because he is old or decrepid, or because he may have time to spend thus, without regard to his qualifications for making of roads, or regardless of his intelligence, as a citizen, furnish an additional reason for our lack of progress in the art of road making. The most expensive commodity the public is called upon to pay for, is the incompetent officer, and until a premium is placed upon recognized ability even in the minor offices, the same state of affairs is likely to continue. All men who till the soil are not successful farmers. All mechanics do not succeed well, neither do professional men always succeed in their profession, nor does the speculator always make his calling a success. These are suggestions to which every man will doubtless subscribe. But has any one ever seen or heard of an individual in any of the pursuits of life who did not thoroughly understand road-making (in his mind?) Our first step then on the line of success is to seek for a road officer and elect him because of his qualifications alone. And they are to be found in every township of the State, intelligent, successful economic men, who

do not borrow their neighbors utensils to do their work or the paper to steal the news, and who do not point you to the glorious past as the culmination of greatness. Why not have the road in each township measured, divided into mile sections, carefully inspected by a competent board of road inspectors of three or five, authorized by law to act in such capacity, who having ascertained as nearly as possible the cost of repairs, should then apportion the assessed tax, so much on each mile section, having first numbered each section; of course an equal distribution to each section could not be made, as repairs in some locations would be more expensive than others; if the sum appropriated was not all used on a particular section, it could by the same authority, be appropriated to that which needed more. And then again as the country is so profusely filled with road-makers (in their minds) it might be well for our law-makers, in enacting the statute authorizing the board of inspectors, who should act in conjunction with the supervisor, to indicate the width of track, elevation, water ways, cross-ways, &c., in order that the roads may be uniform, and that the wisecracks need spend no time in determining what to do. A provision in the law authorizing a skillful engineer to first establish proper grades, width, ditches, &c., would perhaps be better. While it is convenient to have good broad highways, it would doubtless be much better to have narrow tracks, which could be put in passable condition the year round. The law should require the stoning of those portions of the public roads which at certain seasons of the year are always bad. If it should be too great a burden to do it all in one year, at least a portion of it should be thus permanently improved, and the statute should prescribe the manner in which this work should be done, so as to compel permanent and lasting improvements. Having thus arrived at some systematic plan of road-making, limited by statute, we would first get rid of the useless expenditure of money and time, by each successive supervisor overhauling the work of his predecessor, and next the supervisor would simply be required to supervise work already planned and directed, and thus lose no time in experiments. The supervisor having his work thus defined, and having an appropriation of a portion of the tax for each section in his division of the township, and having the power to collect in cash the amount of the road assessment, and being a man of fair business qualifications and reasonable tact, ought to find but little difficulty in directing the labors of a hired force of men in such a manner as to make efficient work. System in road-making is as essential to success as in anything else.

Nor should the assessments for road purposes be confined to any one class of property. But should cover all kinds of taxable property. No object for which taxes are assessed, is more useful to the whole community than that of making and repairing of the ways over which the whole community must at some time travel, or upon which they depend to have their produce transported to the markets, and which many use for the purposes of pleasure as well. What is the use of large crops of marketable products if the markets cannot be reached with loads from which a reasonable profit may be derived? The cost of transportation over good roads is cheaper to the farmer than over bad ones. Take the present winter when the mud roads have been in such condition that but half a ton of hay is a drag for a team, and compare the disadvantage of the farmer who is compelled to travel over them with one who is fortunate enough to be located near the solid road, macadamized or planked, as it may be, even if he must pay a few cents for the privilege,

and how much better off is he? Attending the markets with two tons of hay hauled by the same kind of team his less fortunately located brother farmer can only struggle through with one-fourth as much, and with no more expense, less wear and abuse of wagons and horses, who will not admit his advantage? Then let us have all kinds of property taxed for this purpose if even a less amount is assessed on it for other uses. And why should the State not help its citizens in keeping up the roads? While the several townships might easily keep in repair well made roads, by assessment on the property within its limits, it would doubtless be too great a burden for the citizens to bear the entire expense of putting them in proper condition in the first instance. The revenues of the State ought to be used for the best advantage of her citizens as a whole, and from the lavish appropriations made at the biennial sessions of our Legislature, to institutions of all kinds, it would seem that there remained in the treasury a fund for which no particular use was in view when it was collected. Let us examine the sources from which the revenues of the State are drawn, and learn thereby what interest the general public have in the State revenues. While it is true the tax the State imposes on corporation stock and limited partnerships nets her treasury nearly two million dollars, and over half a million more is drawn from the tax on gross receipts of these corporations, and also a like amount from the tax on stocks of banks, safe deposit and trust companies, also a tax on loans, county, municipal and private corporations, all of which sources touch every branch of trade and thus indirectly strike the consumer, from the lowest to the highest, the laborer and the man of leisure, for what these corporations must pay for the privilege of doing business, they must make from their patrons. Nor does the matter stop here. From the personal property of her citizens the State draws over a million more of her revenue. If you enter the courts of justice to collect a debt you must pay the State a tax for the privilege on the writ you issue in the case. If the citizen buys a piece of property the State suggest to him, when he ask the county officer to record his deed for the land, the payment of a State tax before it can be recorded. Then when he dies and leaves his will directing how his estate shall be disposed of, his heirs are called on for a tax when the will is probated and the account settled. Thus, if he leaves direct heirs, they are taxed on his account. If he leaves indirect heir his estate is taxed all the more because he left no direct heirs, and the State thus derives over half a million annually from collateral inheritance tax. If the farmer wants to enrich his land to increase his crops, he claims a State tax on the sale of fertilizers and draws annually over seven thousand dollars therefrom. If the citizen wishes to insure his property in a foreign insurance company he is again met by the State's demand for a tax from such companies, another source from which almost half a million is derived annually. The tavern and eating-houses, at which he takes his meals when attending the markets and quenches his thirst, if he is dry on the way, pay a tax of over three hundred and fifty thousand dollars annually. If he desires to patronize the wholesale liquor places, the breweries, the bottler or the retailer of liquors, he is also confronted with a tax demand from the State, and from these sources the State collects annually over six hundred and fifty thousand dollars. If he cares neither for eating nor drinking and concludes to while away an hour in playing a game of billiards, he is informed that to the cost of keeping up the establishment is added a State tax on the tables, and from this source alone nearly twenty-five hundred dollars is derived by the State

every year. If he wishes to amuse the whole family as well as himself and takes them to the theatre or circus, the tickets are a little higher because of the State's demand for a license, from which source her coffers are filled to the extent of eight or ten thousand dollars a year. If he concludes to be a broker, an auctioneer or pedler, the State modestly suggests tax again in the shape of license, from which sources she gathers yearly over thirty-six thousand dollars. If he desires to become a notary public, for the convenience of his neighborhood, a tax of twenty-five dollars is demanded by the State, from which source she received in 1888 over ten thousand dollars. The very pamphlet laws our representatives make for us increase the State treasury to the extent of six or seven hundred dollars. And in addition to the immense revenue derived from tax on corporation stock and limited partnerships as well as the tax on their gross receipts, the State charges them a "bonus on charters" which reached in 1888 the sum of almost one hundred and sixty-five thousand dollars. If the gas or oil company or any of the corporations fail to pay the tax on their stock or bonus on their charters, another tax is suggested in the way of interest, and thus a fund of over ten thousand dollars yearly is drawn by the State in the shape of accrued interest. The penalties "on tax on corporation stock," yields over one thousand five hundred dollars more. The general revenues of the State are divided into two parts, one for general use and the other for the sinking fund, and the money invested in bonds as a sinking fund yield a revenue to the State of \$142,100 in 1888. The Pennsylvania Railroad Company as a commutation of tonnage tax, paid into the State treasury under the act of March 7, 1861, the sum of \$460,000 for the year of 1888.

The New York, Lake Erie and Western Railroad Company paid for the privilege of entering the State of Pennsylvania, the sum of \$10,000 in the year 1888. From escheats over \$5,000 more received. From fees of the public officers of the State \$64,500 was received. \$1,800 cash was refunded to the State in the shape of "unexpended balances" in hands of public officers. The consciences of several individuals bore down on them to the extent of \$81.55, and this sum was subsequently returned to the treasury (from honest souls). A long list of "miscellaneous" netted the State one million two hundred and seventy five thousand more. And the year 1888 showed the sum of over \$11,000,000 dollars in the State treasury, counting the balance on hand the previous year. It will be observed that every source of the State's revenue reaches to the very centre of her industrial callings. And I do not refer to these several items complainingly, for as the very object of government is the protection of her citizens, for this they must necessarily pay a price, and although "charity covers a multitude of sins," would it not be wise to act for a brief period upon that other equally useful proverb "be just before you are generous." Let the generosity which prompts our legislators to extend charity to so many institutions over the State find vent in extending justice to their constituents, first by providing for a share of the revenues in which they are so largely interested, to be used in the constructing of permanent highways, made under a system, directed by statute and controlled by officers, as indicated herein, or in some other similar manner, so that the whole subject of road-making is not left to the discretion or rather lack of discretion of the township supervisor, and in order that our roads may be uniform in construction. It is admitted that the legislative, judicial and executive departments of the State government are necessarily expensive and eat deeply into her

treasury but economic legislation with a view to the benefit of the greatest number of her citizens, and limit on the prodigal display of charity by our Legislature, would teach the management of the several institutions in the State, which make their demands on the public treasury through the Legislature, to exercise more care in their financial affairs and would thus be beneficial to them in the end. If, as has already been shown, the citizen in every vocation in life is so closely connected with the production of the States revenues, he ought to be equally benefited in the general distribution, and how little of this general fund is returned to the several counties, outside of the judicial salaries. As a remedy for the admitted needed improvement of the public roads, let us first have our statutes authorize the collection of the road tax in cash, next make all classes of property subject to a tax for road purposes (and in this but little change would be needed as it is very generally covered by our present law.) Let us have a State appropriation for a few years, with an enactment directing a systematic, uniform method of road-making, commanding its positive observance, and in a few years we will be boasting of the good condition of our roads. One of the troublesome questions of to day is the use of prison labor and how it can be most profitably employed and make the least conflict with free labor. It costs each and every county in the State an immense sum of money each year to run the criminal courts and provide for its criminals after their conviction, in the several work-houses and penitentiaries. Could not some wise legislator suggest some measure of relief from this burden on the tax-payers, by employing criminal labor for the improvement and repairing of the public roads? It would seem feasible, and would certainly add force to the feeble efforts now in use, and would in a great measure exclude criminal labor from competing with the laboring classes. Of course it could not be applied to every criminal but could doubtless reach a great majority. Some error in the law or in its execution has doubtless been made in the construction of our roads, and as books and papers are said "to be the slow but sure weapons of overthrowing error," and as it is further said "that often wild and apparently unreasonable opinions are but the shadows of unrecognized truths."

ROAD LAWS OF PENNSYLVANIA.

By D. J. WALLER, *Bloomsburg, Pa.*

Governor Beaver's call of public attention to our road laws was timely and pertinent. If emphasis was desirable, it has been found in this exceptional season.

The waste, in this department, through want of system, is appalling. Could horses talk, they would cry, shame, on our cruelty. The abuses are so numerous and glaring as to need no catalogue. Our duty is amendment. This must be radical—no patch on our old garments.

The application of science is the prime factor in reform. The railway system presents an embodiment of the principles and their application. Grade, alignment, and material must control—rather fences—fields and farm buildings. Leading highways belong to the

Commonwealth—not to the townships. These are entitled to prime consideration. If stock-holders in limited numbers can find profit in building a costly railway, the whole people can safely invest money in the best possible highways.

PRACTICAL APPLICATION.

Let a competent civil engineer be provided by law, for one, two or more counties, according to area and population, who shall have control of all public highways, subject to the jurisdiction of the courts. When the best location and grade attainable, has been settled, the time question, should be determined, in view of emergencies and financial resources. Cases may arise where progress during a series of years will be needful for the best ultimate results. Courts and grand juries may regulate the rate of progress. But a plan once adopted should be pursued, unless changed by the engineer, with approval of the court. The final road bed should have the most durable surface that available material will afford. Questions of right of way may be settled by argument or by reference in case of difference.

The constructional period may be both hastened and prolonged by an authorized issue of "road bonds," of long time and low rate of interest, which would constitute a desirable investment for savings.

Payment of "road tax," ill-directed labor of teams and men on the "township roads," was once a necessity, as were "shinplasters." Labor is no longer at a discount. Two classes may advocate the old abuse, viz: those who wish the same wages for talking as for real labor; and merchants, millers, and mechanics, to whom the former class are willing to pay their indebtedness in the cheap currency of "working out their road tax." An energetic supervisor is not a favorite candidate for re-election with these classes.

We are a young nation, with a wide area, and some things yet to learn. The old Roman roads, over which armies marched centuries ago to the conquest of the world, may teach us permanence. Contrast the highways of England with the trackless wilderness of the older continent, where Stanley's braves perished with exhaustion, and we have a standard for the necessities of national development.

WHAT KIND OF ROAD, AND WHAT ROAD LAW, AND WHAT SYSTEM OF ROAD WORK IS TO THE BEST ADVANTAGE?

By F. DARLINGTON, *Lincoln University, P. O., Pa.*

On these important considerations of the road subject the farmers of this locality seem united in their opinions which I will here state with the grounds for our conclusions. We decide that dirt roads are best for the country, that stone ways are necessary only by the heavy drainage of cities, towns, and other centers of public travel and traffic. That soft earth roads are best for the travel of man and beast, easier for the horse and pleasanter for the rider. And that while dirt makes the cheapest road, there is also a constant saving from the greater durability of horse and wagon used on the summer road then when used on a pike.

But here is the query, can a dirt road be always good? It cannot be always smooth and dry. For rain will soften and make mud so that the buggy and garments of the fast driving city dude will receive mud spots which to him is proof of bad roads. But if it requires deep mud quagmire or quicksand to make a road bad, then bad roads are not unavoidable—not a necessary concomitant of earth roads, but only the companions or accompaniments of bad road-masters, the result of incompetency or neglect.

There is but little bad roads that simple drainage would not prevent, occasional places may require stone (never the amount required for a pike) or wood along the middle of the road to insure solidity in the covering of earth, and there may be pieces of road which from situation and composition are so constitutionally bad, as to require piking or macadamizing, but I don't know of such a case. While we have had many bad places in our roads this winter, I have seen none that I think could not have been prevented with much less money and labor than was expended after they became bad in filling up, bridging over and to make passage even possible. On this point one illustration may suffice. Near by is an extended piece of the worst of quicksand road bed from which during a part of many of the last twenty years this road as unfit for use. Two or three years ago when the ground was dry, stone (not half enough to pike it) was filled in along the middle of the road, the sides ditched, stone covered over and top rounded up with damp earth (dry dirt will remain loose, form dust and with rain make mud) which travel packed. During the present exceptional bad winter this piece of road has been firm and good, with heavy hauling over it. What was done with this piece of road would seem practicable with any other. In the matter of road law and system of road work, we endorse what we have in our own township, and recommend the same for every other township and district where roads exist, and it should be provided for in a general road law. This conclusion comes after a quarter of a century's experience under the practical operation of our road law system. Under this system the management of the public roads is given to the farmers and other real estate owners, to each is apportioned that section of road that runs through, along or is nearest to his property. The amount of road is proportioned to the assessed value of the property. This division or allotment of the road to be kept in repair is perpetual, subject to no change from caprice or rival interests. If an individual makes a permanent improvement on his section of road, he reaps the lasting benefit of his work. The tendency under this system being towards a more permanent improved condition of the roads. The only road tax collected is the small amount required to open new roads, build bridges and to pay the supervisor for such incidental work. Thus the care of the roads is rested with those most competent of the trust. For who else can be so well qualified as the farmers each with his own piece of road, about which he knows more than any supervisor can be expected to know, for from frequent travel and work the farmer learns the solidity of the ground, the top and sub-soil, their tendency to wash or develop quicksand, and can best judge of the proper road work. And by always having his team and other necessary appliances he is best fitted for the work. While from having many fragments of time that can so well be applied to the road, and in being able to save so much by timely attention, he can do the work most economically. And as the farmer has the greatest need and use for roads and is therefore most interested to have them good, they can most safely be entrusted to his keeping.

These conclusions are not only warranted by reason but conformed by experience. It is estimated that for the same amount and quality of road work, or road improvement, or condition of road maintained there, is not more than one half the time and money expended in the township as there is expended in other townships that have a different system of road work. As for instance, where the work is done by those employed to work out their tax, and where the motive is more to work the tax out than to do effective road work.

When the visionary dreams of a general county pike, macadam or appian road have passed, and the citizens become united under the best systems in the work of improving dirt roads, better roads follow.

STATE AID FOR PUBLIC ROADS.

By S. R. DOWNING, *Member of the Board, West Chester, Pa.*

Section first, article tenth of the constitution of 1873, reads: "The general assembly shall provide for the maintenance and support of a thorough system of public schools, and shall appropriate at least one million dollars each year for that purpose."

Since the adoption of the new constitution in 1873, the appropriation for schools has increased to the present annual sum of two millions of dollars.

And yet in 1834 and 1835 when the question of accepting the common school system was submitted to the delegates representing the school districts of intelligent Chester county, a considerable majority in both years voted *not* to accept.

When the office of county superintendent was established, it also encountered opposition virtually based upon the same argument used to-day against competent county supervision of roads, one class said it would multiply public offices, another class deemed the office useless and the money paid to the officer would be better expended by adding it to the school fund. So that between the years 1834 and 1890, a vast revolution has occurred in the public mind as to schools. State appropriations have passed from thousands to millions, the offices of State and county superintendent being created and county institutes encouraged by bounties, all primarily in the teeth of popular dissent and by the gradual yielding of popular opinion.

It is pleasant sometimes, and especially in a "good fight," to be reminiscent, and in some instances too, to know that history repeats itself, and beyond this again to learn perhaps, in that economical knowledge grows with the years, the struggle for better things in newer directions may be less severe and of shorter duration to later generations. True, this side the millenium it seems that in all good movements, struggles must need be. Indeed it would be hard to distinguish the merits of such force and statesmanship as that of Thaddeus Stevens, who won the name of "Old Commoner," and a lasting, grateful remembrance by his advocacy of the first form of our present educational system, it would be, I may repeat, hard to catch the wonderful and happy example of such men, were it not for the showings of these struggles that must ever be in our reach after better methods and conditions.

Should we canvass the matter honestly, I believe we will readily conclude that if a State can appropriate money for schools, it can with the same ease and upon the same basis of right and demand appropriate money for roads, and that after all, the greatest difference between the propositions, is but the spelling of the word "school" and "road" so far as an appropriation is concerned.

An appropriation for schools is mainly money expended as consideration for a value received, and that equally received by an entire public. Thus money expended for a proper laying out, structure and maintenance of roads would be a like consideration for value received by the general public. The appropriation of money for roads has little, if any thing, to do between the meaning of education and road structure. An appropriation cannot create or develop mind or facilitate instruction, but can be of profit in comfort, happiness, cash. Thus when appropriations have been advocated for schools, the main cold argument therefore has been the value, the worth, the dollar and cent consideration, if you please, of education to the State and nation in the matter, of safe, harmonious, comfortable, protective citizenship, because it is this cold cash saving and profit that is the axis upon which legislation turns.

That good solid roads throughout the State would be of general advantage and profit to the people, and not only to the people, but to the business institutions of the State, does not admit of a doubt, and need not be very fully demonstrated here, for every measure that adds to the value of property increases the value of security to banks and investors; every measure that facilitates the movement of persons and articles increases the business of railroads, every means that makes intercommunication rapid not only helps all financially, but even beyond the consideration of money gain, really advances education and religion.

Did not the abbots of France away back in the twelfth century not only build such magnificent churches as that of St. Denis, but lay up clean smooth highways to the doors of the churches from far villages? Thus did they not link in one both altar and home by the single act of circumventing the obstructive sinfulness of bogs and their permission? Money appropriated by the State for a return of that which money is used to purchase may result undesignedly in bringing about more christianity and education. Indeed in canvassing the matter of profit in State appropriations for roads, it seems plain that the increased general prosperity resulting therefrom would extend so far in fact, as to increase the revenues of the State, and thus in time lighten the burden of taxation, so that in due season it would seem any increased taxation by reason of appropriations insuring rapid transit would be equalled and over matched, not only by a profit to the tax-payer, but by a profit to the State based upon advanced individual and corporate prosperity.

Then if money is appropriated by the State for schools because education is of value to the State, good roads being of value to the State, would not an appropriation by the State for solid smooth highways be a like matter of profit to the entire people of the State as are appropriations for education to the same people? If this be true, an appropriation is due the people of the State upon the precedent established by the gift to schools.

Land is condemned by authority of the State for roads as for school sites. But there is an inequality between the two. The State takes our lands for roads, but unjustly goes no farther. The State on behalf

of schools grants a seizure of lands, but considerably goes farther than in the case of roads. First, by giving the schools authority to borrow capital. Second, by instituting and paying for State and county supervision. Third, by assisting directly in the maintenance of schools by appropriations of money.

The people are satisfied with all school legislation, but road legislation seems to be inoperative, ineffectual, unsatisfactory.

Again, the State by its legislation authorizing the seizure of land has given license to such a multiplicity of roads as to be beyond the power of over-taxed land owners to maintain *in a safe condition*. It is all very proper that land be condemned for roads the same as for schools, and that roads be multiplied in behalf of the public, but when a fraction of the public is unable to maintain all roads in good and safe condition, and as required by law in such condition during winter and summer, throughout all the year, and that again for an entire and ever increasing travel and traffic, when a fraction of the people is unable to so maintain roads, then certainly we make true discovery that road legislation, unlike school legislation, is incomplete without the assistance and agency of the State further than the mere grant of condemning land.

Should a shoal gather across the bed of the Delaware river checking trade between Boston or Baltimore and Philadelphia, the merchants of Philadelphia are relieved by the government from paying toward lifting the shoal.

Our general government also appropriates, as encouragement to trade, \$200,000,000 in steamship subsidies.

Now trade is not confined to ships or rivers, or again the passage of armies is not limited to seas. Trade is not confined to railroads, and yet railroads being factors in trade, the general government, as a principle of national economy, has lent lavishly of its credit and given as lavishly of its lands for the building of lines over the great deserts and mountain ranges of our country for the sake of trade.

The heaviest trade of Pennsylvania is the wagon or common road trade. If this be true, why should it not be as fully a matter of public policy for a State to encourage local trade between farm and county town or township village by a partial building and support of roads as it is public policy for the general government to subsidize ships and railroads, to hold rivers clear and even to appropriate money in the name of creeks that are never touched all for the sake of general trade.

And yet the real estate owner of Pennsylvania, notwithstanding his over-burthen of taxation equalling ten to one, comparatively, with that of the personal property owner, or eight to one with that of corporations, the real estate owner, with all this over-burthen amounting almost to carrying out of the single tax theory, does not crave of the State any special bounty to his class in asking State aid in the structure and maintenance of roads. He asks for that which will add to the prosperity of all classes and facilitate all honorable industry and enterprise. Not only this, but the granting of State aid for roads is asked upon the score of an adjustment of rights, and charges real, personal and corporate wealth on account of the common rights and privileges each may hold in the common roads. It is a fraud and not a principle that one class shall construct and maintain roads for an entire population of a State.

Many real estate owners may indeed oppose a State appropriation for roads fearing that such legislation would interfere with any bill

equalizing taxation. Then again certain land owners may urge that the better way to secure the means to build roads, would be in the plan of townships collecting equally from personal as well as real estate for that purpose without any inter-meddling by the State.

This all seems reasonable in the way of objection to State aid, but when we come to look within and know of that streak of our common humanity which ever revolts against taxation, we find that no matter how road taxation may be sub-divided between all classes of wealth, any extended taxation for roads would in too many instances be out-voted, defeated by a township citizenship, and that too representing all elements of wealth and trade paying taxes, and all simply because of a general repugnance to taxation and a failure to study the economy or profit of an investment in better roads.

You may remember that at the last meeting of this board, Mr. Kratz, the valuable member from Montgomery county, cited the suit of a township against its supervisor for carrying out the law in building a good road. I would really be pleased to know that by reason of the excellent lesson Judge Yerkes embodied in his decision sustaining the supervisor, that this good, strong, conscientious officer was re-elected. And yet a plea of his constituents might have been just had it been to the effect that a fraction of citizens is really unable to build and maintain roads within the legal standard. As was stated by Judge Yerkes, the law of Pennsylvania already contemplates the best, most economic road. But here is a supervisor who is sued for being so original as to carry out the law. An increase of taxation being repulsive, such might have been the case had all property been taxed. Supervisors, however, do not desire to be sued for doing what may be right, nor for the same cause do they relish being defeated in a canvass for re-election. Thus in order that our ample road laws, already in existence, shall be made operative, effective, there needs to be an agency and authority in every county free from all township hindrances and obligations, and further, instead of penalty as may be suggested for the enforcement of the law to the still greater bewilderment of the supervisor, it is better that there should be inducement or award by the State for the fulfillment of the law. This too as an aid to the real estate owner who unjustly bears the entire burthen of road maintenance.

Thus it seems, however various and clashing our early public thought may now be, road legislation will follow close to the design of school legislation, close to the historic line of road legislation in older countries, until common roads will receive the special favor of all State and perhaps our national government. All history, all solid exhaustive thought, argument, investigation points this one way, and in this direction will public sentiment center and drift.

CONSTRUCTION AND CARE OF PUBLIC ROADS.

By ISAAC ELLIS, Dalton P. O., Pa.

(Read at Dalton Institute.)

The surplus products of the farms pass over the public roads on their way to the mouths of the hungry millions who are engaged in other industries. And a large portion of the product of the labor of those

engaged in other industries finds its way over the public roads to the farms for the convenience, comfort and assistance of the farmer.

Hence the "construction and repair of public roads" is an important subject, and a meeting of farmers a proper place to discuss it. It is a pleasure to drive on a good road. It is painful to drive on a poor one. The cost of construction and repair of a road depends upon the location. And the location depends upon the accommodation of the people for whom it is intended. The best location that will meet the requirements of the case should be selected. Dry ground, easy grades, few bridges consistent with the shortest route should be sought after. It often happens that one or more of these good conditions cannot be found. If swamps or steep hills are met with, locate around them if possible. It is better and cheaper, considering construction, repairs and travel, to go two miles on dry ground and easy grades, than one mile on swampy land or heavy grades.

If any part of the route is over wet land it should be under-drained with stone or tile drains if a suitable outlet for the drains can be found. This is important, for the more water there is in the ground, the greater will be the expansion by freezing, and consequently the softer will be the road bed in winter or spring when the frost leaves the ground. Under-drain the public roads where they need it, if it is practicable.

Subsequent repairs will be less, and the ease and convenience of travel will be greater. The common practice of taking earth from one or both sides of the road, rounding it up in the middle so that it will be gradually sloping toward the ditches is correct for all roads made of dirt. But some of the main roads should be macadamized as soon as the finances of the townships will permit, and the broken stone should be placed in a compact mass not less than six inches thick and from ten to sixteen feet in width, or in thickness and width proportionate to the amount of travel, and well rolled and firmed down. Grade the hills as much as possible considering all the circumstances. Remove the earth from the hillocks and highest places to the lower parts of the road. Let the work of construction and repair of all roads be done with a view to make the grades better and not worse. Water breaks should be constructed, beginning near the middle of the road, running at an angle of about forty-five degrees with the direction of the road, so as to turn the water from rains and melting snow into the ditches on each side. Never build a succession of dams from, one to two feet in height, at right angles with the course of the road, and call them water breaks.

They increase the grade of the road very much, and are an impediment to convenient and easy passing and travel. All substances in motion abhor a right angle. For this reason it is not the best way to accomplish the object intended and ought to be discontinued.

The practice of conducting water across the road on the surface is so plainly wrong and contrary to all correct principles of road making, that it needs no argument to prove it, and ought to be prohibited by law. Where it is necessary that water should cross the road, culverts or bridges should be built under all circumstances. Wherever stone are plentiful, they are the best material for constructing small bridges. If made with care and on correct principles, the subsequent repairs will be very slight.

Iron is a good material for bridge building. So is wood, and it is a debateable question as to which is the better material for bridges, iron or wood, with the chances, probably, that wood will have the

best of the argument. Remove all loose stones from the surface of the road. Don't cast them into the ditches, or along the sides of the road, or into the fields; but gather them together, take them where they are needed to build or repair the road, and where they will do the most good. But the "construction and care of the public roads" depends largely upon the authority granted by law to construct and repair the same. A learned judge on one occasion prefaced his charge to a jury by saying "gentlemen of the jury, there is no profound mystery in law, the common sense view is usually the correct one."

The act of April 15, 1834, says, "it shall be lawful for supervisors of any township to lay a rate of assessment not exceeding one cent in the dollar upon real and personal estate, officer, trades and occupations, for the purpose of laying out, opening, mending, or repairing of roads and highways, and for the making or repairing of bridges, and for such other purposes as may be authorized by law."

This authorizes the regular yearly road tax levy, and sums to provide for all the expenses necessary to construct and repair the public roads. This is the common sense view. But there is a proviso in the act of April 15, 1834, which says, "before issuing the duplicate and warrant for the collection of road taxes, it shall be the duty of the supervisors of every township to give notice to all persons rated for such taxes, by advertisement or otherwise, to attend at such times and places as such supervisors may direct so as to give such persons full opportunity to work out their respective taxes."

If the road tax is paid in money instead of labor, the money so received can be used to pay any debt necessarily incurred in constructing and repairing the public roads. After about one year's operation of this law, it was found that in some of the townships the road taxes were nearly all worked out, and there was not road tax collected in money sufficient to pay the supervisors for their official services. To remedy this the Legislature passed an act on the 28th day of February, 1835, authorizing the supervisors of any township to "levy a rate or assessment, and collect the same for the purpose of discharging any just debt due a farmer, supervisor or overseer of the poor." This tax is levied and collected for a special and clearly defined purpose, namely, "to pay any just debt due a former supervisor or overseer of the poor, and cannot be used for other purposes." The supervisors and overseer of the poor are equally entitled to the money according to their desert, and the auditors settlement with them will disclose the just debts due each. The supervisors cannot use the money from this tax to pay for labor or contract work on the public roads, neither can the overseers of the poor use it for the support of the poor. This is the common sense view. The act of May 24, 1887, authorizes the supervisors "at their option, to purchase for the use of the irrespective districts plows, scrapers, road machines, and such other implements and materials as may, from time to time, be found necessary in opening, constructing and repairing of said roads, highways and bridges. If necessary for the payment of the machinery, implements and material, the supervisors may, and they are hereby authorized to collect annually, in cash, not exceeding twenty-five per centum of the rates or assessments by them respectively laid in each year for road purposes." This is not a separate levy. In fact, it is no levy at all, but a portion of a tax already levied, set apart for collection in cash, to be used for a special purpose mentioned in the act, and cannot be used to pay labor or contract work on the public roads, nor to pay the supervisors for their official services. This is the common sense view.

By the act of 1836, supervisors must obey "the orders and decrees of the court having jurisdiction, and circumstances may be such that the court will order the supervisors to levy and collect a rate or assessment, and apply the money as directed in the order." So it appears that the act of 1834 makes it lawful for the supervisors to levy and collect a tax. And the act of 1835 makes it lawful for the supervisors to levy and collect a tax. And by the act of 1836 the court may, under some circumstances, order the supervisors to levy and collect a tax. And the act of 1887 authorizes the supervisors to collect a portion of tax already levied, in cash. This is a strange state of affairs, very troublesome and perplexing to the supervisors, the collectors, the treasurers and the taxpayers. Such a condition of an important branch of the municipal affairs of the townships amounts to a nuisance, and ought to be abated by some common sense legislation.

The general road law of 1834-36 has been in force more than fifty years, the most important addition being the act of 1887, authorizing the supervisors to collect, in cash, a portion of the road tax levy, if necessary, to pay for machinery and material. It may have been good law half a century ago. It is not bad law to day.

If the twenty-five percentum of the road tax now authorized to be collected in cash could be used to pay all just debts of the townships under the control of the supervisors, it would be a great relief. Or, collect all of the road tax in money and use it under a wise supervision of the supervisors to construct and repair the public roads and bridges, and for the payment of all legal debts of the townships. Or make it optional with the supervisors, whether the road tax shall be paid in money or labor. This road question has been agitated by the Legislature for a dozen years or more. The State Board of Agriculture has deliberated upon it, and sent the result of its deliberation to the Legislature for the edification of the members thereof. The Legislature has wrestled vigorously with it, and the result has been that the question has come out of the tumult unchanged and uninjured. And now we have a committee of thirteen—three members of the Senate, five members of the House, and five competent citizens, who are making a vigorous and determined attack upon the question, with the intent of reporting it to the Legislature in such a condition that the members thereof can vanquish it entirely and give us a better road law than the law of 1834.

We expect much from this committee. We might reasonably expect more if it contained seven competent citizens instead of five. And yet, when it comes before the Legislature, the result may be as heretofore, the spending of time and the drawing of valuable pay.

ROADS AND ROAD LAWS.

By F. H. BUNNELL, *Dimock, Pa.*

(Read at Montrose Institute.)

What is a road? and what is it for? You all say at once, that it is a place for the *public* to travel on, then if it is for the public to travel on, it should be built in the best possible manner, with the means at hand, for the accommodation of the public, having due regard to its location,

and the needs of those that will use it. Hills should be gone around instead of over, gullys should be filled up so that as near an even grade can be had as possible, in order that the progress of the public need not be impeded. It should be built by a direct tax upon every species of property in the district where it is located, should be let out to build, to the best responsible bidder, the bids should be sealed, and given to the supervisors to consider before they award the contract; the contract and specifications should be together, and the builder should be made to live up to it in every particular. Roads can, in some cases, be built by the supervisors by the system of "working out the taxes," instead of paying the money and letting them by contract, but as a rule, I think it does not give as good results; for while there are some men that will go on the road and do as good a day's work as they will at home, there are others that will not, hence a few do the work while others get credit for the time they spend; the supervisor does his duty, calls them out, &c., directs the work, yet don't get it done, consequently he is blamed by the willing workers because he has not got more done on the road for the tax he has expended; it is generally conceded that spring is the time to build and repair the roads, but I consider it very poor policy to use up all the funds of the district in the spring and have nothing to repair the damages done through the summer and fall with, for sometimes a very little repairs save a large amount of labor, and if there are no funds to do it with, or no persons that will do a little for the public without pay, (and that kind of people are getting scarce,) a road that was built in the spring gets out of repair and stays so three-fourths of the year, damaging itself, and at the same time being very inconvenient for the public to use. I have in my mind a piece of road that was worked nearly one year ago with a road machine, great stones that should have been taken out were partly covered up and left, the water bars, if any, were too small and soon wore out, and the water has run in this piece of road nearly all winter, and to-day it needs more repairs then it did one year ago, and I may add right here that the supervisor of that district travels over that same piece of road as much as twice a week, and has since he was elected. This is but one case. There are probably many more in the county, and whose fault is it? Is it our fault or not? On the grounds that principals are responsible for the act of their agents it must be our fault who makes these supervisors? Who gives them the power to use our money, or to waste it? How do we do it? There has been one made in every town in the county this spring, and what were the qualifications that they had to have to make them capable to fill so responsible a position, to make them the guardians of the traveling public and our pockets as well? Did anybody enquire if they were good business men, if they were capable of building a good road, if they knew how to superintend a gang of road builders, if they were men that were interested in the general welfare of the public. No! As a rule these questions were not asked. But if in a republican district, the qualifications had to be, have they always supported the nominees of *our party*; have they ever been mixed up in the greenback or prohibition business. If in a democratic district, the questions were nearly the same, with perhaps the addition of how did they vote on the amendment. In either place if they are "square on the books," they are elected for the ensuing three years, and if they are good capable men, we are extremely lucky; if on the contrary they prove to be wholly incompetent for the responsible duties that devolve upon them, the roads get out of repair and are left so,

bridges and sluices become dangerous, animals become injured, or worse, human lives are sacrificed on account of their carelessness, and you are called up before the court to settle the damages. How will you console yourself then? Put on a long face, draw a long breath and say you are very sorry; it might have been different if the other fellow had been elected, but John is a good fellow, and he has always stuck to *our party*, he never had an office, and I thought it was his *turn*.

Fellow farmers! how long are you going to sacrifice your rights, your interests, your everything for our party? How long will it be before you will realize that you are citizens with rights to be respected, with duties to perform that are above mere party interests? Much has been said at former institutes in this county in favor of macadamizing our roads; this would make them nice, and no doubt we would all enjoy riding on them if it were done, but until the merchant who hauls large amounts of freight over them, the doctors who drive over them in their professional business, the lawyers who use them for business and pleasure, the bondholders and the money lenders who go over them to collect their rents and interest, and all others, who use them for business or pleasure, pay their full share towards making them, we farmers should not be asked to pay taxes, on what we owe, to make better roads for people that use them more than we do. I notice in former institutes that fault has been found because townships that had bought road machines had not reduced taxes as promised. The trouble here lies with farmers themselves, all the work cannot be done with the machine, it does a great amount of work and does it well, but there is other work to be done, and all the men that work on the road cannot profitably ride the machine; four is two too many for the profit of it; one man can and should drive the four horses; in most cases one man can manage the machine; the other driver and the man that is learning to use the machine, had better be doing something to reduce the tax; no particular need of his learning the business until after he is elected. While we are looking after the rates of road taxes in the townships, perhaps it would be well to look at our county expenditures for road purposes, which, according to the last report of our county commissioners, foot up as follows: county bridges, \$6,925.50; and road, bridge viewers, \$1,570.91; road damages, \$2,827.50—Total, \$11,323.91, or \$1,507.88 more than one-third of all the taxes collected in this county. Now, fellow farmers, this all comes out of our pockets, and in addition to it, we pay quite a large sum for collecting. If those bridges were all needed and were an actual necessity under existing laws, it is all right, and we should do no grumbling, but perhaps it will be well for us to keep our eyes open in the future and see that none are built that are not needed.

As regards the amounts paid for damages and views, I hold that the public should pay for private property when they take it for public use, but no viewer should allow himself to rob the public to pay a fictitious value on private property. Neither should a private person place his property in the way of the public and say that they must go around him simply because it is his and he don't care for the public welfare. Much of the money paid to viewers, is paid for reviews which in many cases are gotten up wholly for spite, or because some one that lives up on a high hill is having the public travel taken from him by a new and better route around the base of the hill, so he gets a viewer to see if he cannot make the public come up and see him every time they go to meeting, mill or market, he always gets left, as he should be, but the

county pays the bills. I think that our road laws should be changed so as to stop some of this tomfoolery and expense, but never will be while we continue to send men to make our laws that are absent or sick when any thing of interest to us comes up to be voted on.

OUR PUBLIC ROADS.

By JOHN C. BOAL, *Kirkland, Westmoreland Co., Pa.*

We have always opposed the making of a general road law for our State, because we felt that such a law would be very injurious to many of our citizens on account of the diversified environments and conditions in the different localities of the Commonwealth. For instance, a law which would require the macadamizing of our public roads in all localities of our State, would work much mischief and produce much dissatisfaction on account of a lack of sufficient material for such purpose, in many localities. Neither would we favor a law for our entire State which would require the payment of road tax in cash. We consider the idea of such an arrangement as very absurd.

Why should the farmers be deprived of the privilege of working out their road tax, for they are in a position for doing the work on our roads at a price that no other class of men could dare to compete with.

We are aware that the present condition of our roads, in the hands of farmers, are in a very unsatisfactory condition, but that is not the fault of the farmers; it is because our road-makers are manacled by a road system which is extremely absurd. Give the farmers a good system, and they are the very men who can and will make good roads. Our present road system is an outrage on civilization, and no set of men on earth can maintain or furnish good roads under it. Just look at it for a moment.

It will take up a road in a certain locality for repairs, and in a few days all the road tax in that locality will be expended in moving around a lot of loose clay; as few strokes of the supervisor's pencil and the road tax of that locality is officially declared to be liquidated for that season, and no more attention is paid to the interests of the traveling public in that locality until the lapse of twelve months, and this is just the way the public roads are maintained in hundreds of other localities in our State; and I ask is it right to lay the blame of bad roads on the farmers? A road system which will only look after the interests of the traveling public once in a year should not be tolerated for that length of time.

Farmers have sustained untold injuries for many years by such an insane road system, and to judge of their abilities for making good roads, by what they have done under the present absurd road system, and to take the public roads out of their care and management by compelling them to pay their road tax in cash, to subject them to still more injustice by making them victims of another extreme system. We believe that there could not be a wiser policy adopted, for at least many localities of our State, than to give the roads into the care of those farmers whose lands the public roads traversed or abut, and require such farmers to (work out) a tax of 4 or 5 mills on the dollar of the entire valuation of their property, and collect a cash tax of two or three mills on the dollar of the other residents, whose premises are not

encumbered with the public roads, and use this cash for building bridges and for furnishing material for box culverts, and for making permanent improvements on our roads, etc. To adopt such a system for many of our localities, would, we think, be very beneficial and would cut up by the roots many of the absurdities of the present road system. Our roads in Western Pennsylvania, with few exceptions, are simply clay ridges or rather clay flats, and usually there is no attention paid to drainage oftener than once in a year, and side drains and water courses of all kinds are left to spread their contents over the roads in all seasons of the year, and the consequence is, that we have to occupy mortar beds for a highway of travel.

If farmers had the control of the roads on their farms, we would have a standing army of sentinels on our roads in all seasons of the year to prevent the condition of things we have just described; and in addition to this, we would secure much permanent improvement on our roads by the same system, and at a very moderate cost of all concerned, for farmers would draw many loads of stone off their fields every year and put them on the soft depressed parts of the roads.

Who can estimate the advantage over our present road system of adopting a system which would take care of our roads, every day in six, and which would make a few rods of permanent improvement every year on our roads on every farm. If this system had been adopted fifty or one hundred years ago, how different the condition of our public roads would have been to day.

If farmers were delivered from the abject bondage to which they are subjected by the requirements of the present barbarous road system, and were permitted to conduct the management of our public roads under an efficient system, they would soon free themselves from the charge of "bungling road-makers."

There never was a more unreasonable or unfounded accusation preferred against any set of men than to lay the blame of bad roads upon the farmers. They failed to give us good roads simply because they did not possess the power to work miracles. They fulfilled the requirements of the system they were laboring under to the letter, but it was an insane system, and bad roads were the inevitable result. We should learn wisdom from the railroad companies. They have adopted a system for the management of their roads which in many respects is just the opposite of the system adopted for our public roads. We destroy vegetation on our roads every year by torturing and scalping their sides. And such barbarism and utter lack of economy, and we had almost said lack of common sense, comes home to us with a vengeance, by the unprotected sides of the road sloughing into drains and water courses of all kinds, and turning their contents on to the centre of the roads. The railroad companies are careful to induce and promote the growth of vegetation on the sides of their roads to prevent the sloughing of banks, and they apply fertilizers for this purpose.

We do think that it would be a wise policy for many sections of our State to make a careful measurement of the roads in each township, and place the roads under the care of farmers who would have individual control over those roads on or abutting their farms.

In order to show the equality contained in this suggestion, we illustrate as follows: Suppose a township to contain thirty-six square miles, or in round numbers 23,000 acres of territory, with a valuation of \$30 per acre, the total would be \$690,000, a levy on this valuation of three mills on the dollar would make the road tax of the township amount to

\$2,070. With sixty miles or 19,200 rods of road in such township, there would be a tax of nearly eleven cents on every rod of road in the township. A man with a farm charged with eleven dollars of road tax, the farm having an abuttal of fifty rods on the public road, would be required to work out \$5.50 and to pay \$5.50 in cash less the difference, which we think should be made when taxes are paid in cash instead of being worked out. With this arrangement, we could dispense with the service of supervisors, for which we could substitute a board of inspectors, say six in number for each township, whose duty it would be to inspect the roads twice every year, and to travel into divisions in each township.

The awarding of two or three classes of premiums for the best sections of road, would be a good investment of a little money. With the reference to the propriety of extending State aid for township roads, I think it depends on circumstances whether or not such aid would be of any real benefit to our citizens. If there would be a corresponding increase of tax in such localities as would receive aid from the State, I would see no advantage in such assistance whatever, even if our roads were improved somewhat. I am sure that local government or officials would have a more perfect knowledge of the necessities in their respective precincts than the State officials, and I believe that the local officials could expend the peoples money for road purposes to better advantage than the higher State officials, who are less posted with regard to local circumstances and necessities. Our formulated opinion is this: we believe that unless the State secures the means for extending aid outside of her agricultural citizens, she had better withhold such assistance, for we are sure that the citizens of each township would much rather raise and disburse their own funds in their own locality, as they would then be measureably certain of receiving a just equivalent and equity in disbursement. I am sure that I voice the sentiment of the majority, when I say that our citizens would rather put one-third more money into a township treasury for road purposes, with the assurance that their money would be spent inside of the township, than to put one-third less into the State treasury with uncertainty as to whether there would be a fair distribution of fund. We cannot insist to strongly or to frequently that it will be a blunder to take the making and maintaining of our public roads out of the hand of the farmers; for the farmer can afford to make our roads cheaper for us than any other class of men. The work is right at their homes, and they have spare time for such work, and have all the necessary equipments for making roads. And I am sure, if they had a good system to start with, they would take more interest in making good roads than any other class of men. By all means let us throw away our present road system, or rather our present lack of system, and adapt a good system and give the farmers a chance to redeem their reputation as road-makers. There is no fear of getting a worse system, so their is nothing to loose by making a change. The present road system only looks after the interest of the traveling public once in a year; a change of system would not do less. Think of a system which calls the farmer from their fields once in a year to throw a few shovelfulls of clay or mud on the public road, and then call such performance "road-making," and at the same time subjecting the farmer to much abuse for not keeping up good roads.

In no department of our business do we secure such shabby results for the amount of money and labor expended as we do in our public

road department, and all for want of a good road system. If Americans claim to be a progressive people, they should see that the condition of their public roads support such a claim.

We repeat it; give the farmers a good system, and they will give us as good roads as any class of men can give under the same circumstances, and they can do it for less money.

THE LAW AND CUSTOM OF PUBLIC HIGHWAYS.

By Hon. GEORGE W. HOOD, *Indiana, Pa.*

(From the report of the Board.)

Webster tells us that "a highway is a public road" or "a way open to all passengers." Every thoroughfare, therefore, common to the public, is a highway, whether it be a wagon road, a horse, or foot way, or a navigable stream. In other words, a highway is a dedication to the public of the occupation of the surface of the land for the purpose of passing and re-passing, the public generally assuming the obligation of repairing it. In brief treatise of the subject assigned me, I shall confine myself more particularly, as it was doubtless intended I should, to the law and custom of road ways in the ordinary and common acceptation of the term not entering at length, if at all, upon the law of navigable streams or of the various kinds of thoroughfares embraced under the general term of highways.

The public may acquire the right of way over the lands of the private individual by direct grant, by prescription, by dedication, or by the power to take private property for public use, commonly known as eminent domain. The owner of the soil can, as a matter of course, convey by deed, or he can release to the public, which is much more common in Pennsylvania, the right of way over his lands. Or it may be presumed from such continual using of the way as establishes the presumption of a grant having been made, and which is known as prescription.

The theory of the right of way by prescription originally was that the right claimed must have been exercised beyond a period of time, back of which the memory of man runneth not to the contrary. In England our law commentaries give this time to extend as far back as to the time Richard the First; but time has materially reduced the period and modified the rule to that required by the statute of limitations for the commencement of actions for the recovery of real property, say twenty-one years. The using of the road during this period, however, must be continuous and of such a character as to repel the presumption that the way has been used by the public as a temporary convenience, by the license of the owner of the soil, with a right by him reserved to revoke the permission to use it by the public whenever he pleased.

To dedicate private property to public use, is simply to set it apart to such use with the intention accompanying the act, clearly manifesting and expressing this purpose; no particular form or solemnity is necessary to constitute a valid dedication. It need not even be in writing, but if by parol it may be established by proof of the verbal declarations of the owner of the land.

Sometimes it has been presumed by the silence and acquiescence of the owner and the occupation of the property by the public; but it has been held generally that such use must be adverse to the owner of the title to raise the presumption of dedication. 65 Illinois, 428.

Under the right of "*eminent domain*," the power to take private property for public use is well settled to exist only in cases where the public exigency demands its exercise. In the cases of *Loughbridge vs. Harris*, 42 Ga., 500, and *Hamilton Bridge Company vs. Shubacker*, 49 Mo., 555, and in various other cases throughout the United States, the principle has been clearly and distinctly held that to authorize the taking of private property under the right of eminent domain, two things are necessary: First, property must be taken for the public use; second, provision must be made, except in urgent and extraordinary cases, for just compensation to the owner of property taken.

Now, to meet the first requirement of the condition, it is not necessary that the entire community, or, indeed, any considerable portion of it, should enjoy the benefits for which the property has been appropriated; but if the taking of private property tends to enlarge the resources of the country, encourages new and useful industries, aids the productive power of a considerable number of the citizens of the State, encourages the building of towns, and opens up new channels for the employment of labor and capital, or in any way contributes, either directly or indirectly, to the general welfare of the whole community, and enhances the value of property generally, then the essential element in the right of eminent domain has been complied with. *Peckering vs. Ratty*, 1 S. and R., 511. The Legislature has no power to take private property without compensation.

As to the compensation made to the owner of private property thus taken under this right, it *must* be *real* and *substantial*. It *must* be a sufficient consideration for the property taken, and adequate to and commensurate with the privileges conferred on the public. It need not be in bonds or obligations of any sort, or even in money, the currency of the country; but the appropriation of the owner's land to the public use may be the means of bringing such advantages to him as to entirely or even more than fully compensate him for the land taken. If new industries, as the result of the land taken by the public, are brought to the community in which he lives and his property is enhanced in value, he has to the extent of the enhancement of the value of his property, already received a just compensation for the soil appropriated under the right of eminent domain.

But where statutes exist prescribing the mode by which a party may be divested of his property for public use without his consent, the statute must be strictly followed, because wise policy and sound constitutional principles require us to regard with great sacredness the rights of the individual deprived of his land, and the construction of the statute is always in favor of the individual as against the public. The public, then, having the right of appropriating private property to public use, a pertinent inquiry arises as to what the rights of the public are in the highways; and our first observation is that the public is entitled to the free use of the road in passing over it in the usual course of travel, with the powers and privileges incident to that right, such as digging the ground, turning large rocks, cutting down trees, making and repairing the road; but the title of the land remains in the original owner, subject to the public easement. The Supreme Court of Pennsylvania, in the case of *A. Kirk Lewis et. al. vs. Thomas Jones et. al.*, (1

Penna., 336,) by a unanimous opinion said: "No principle is more familiar or better settled than that the right of the soil in a highway resides in the proprietor of the land over which it has been laid, and that the citizen has no more than a license to pass along it with carriages and cattle," an abuse of which like the abuse of any other license given, not by the party, but by the law, makes him a trespasser against the proprietor from the beginning.

The use to which the State has dedicated her highways is, I think, plain and specific, and no thoughtful, intelligent citizen can mistake the intent.

The public acquires but an easement, and the proprietor of the soil over which the road passes has as much right to protect himself against nuisance on the highways as if committed on his inclosed premises. If a drove of cattle or pigs be stopped in front of your door or root up your soil, the owner is responsible to you at law as much as though they did the same thing inside the fence. *No person* has a right to stand in front of your door and whittle your fence, throw stones at your dog, or use abusive or profane language, without being liable for trespassing on your land. *All persons* have a right to pass and repass in an orderly manner on the road, and to use it for the purpose intended by the law, but not to abuse it.

But whilst the owner of the soil over which the road passes can thus protect himself against the public, he, on the other hand, cannot use the soil for any purpose which interferes with the use of the road by the public for travel. He cannot put buildings on it, or his wagons, or his wood, or anything else which interferes with the free use of the road. He may even be indicted for obstructing the highway.

But notwithstanding the devotion of the surface of the soil to the public use, the title of the land remaining in the original owner of the soil, the owner of the fee retains his right to all the mines, springs of water, earth, timber, and quarries which are within the road and not incompatible with the public right of way. He may avail himself of an action of ejectment, trespass, or waste to protect him in the same, and should the road be abandoned, or the public easement be forfeited or lost in any way, the entire and exclusive property and right of enjoyment of the soil *reverts* to the proprietor of the land. Under the revised statutes of New York, allowing owners of lands adjoining highways to plant trees on the sides of the road, and to bring action of trespass for injuring them, *assumes* and *affirms* the common law principle in relation to such rights. In the case of *Fairfield vs. Williams*, 4 Mass., 427; *Perley vs. Chandler*, 6 Mass., 454; *Stackpole vs. Healy*, 16 Mass., 33, and *Overman vs. May*, 35 Iowa, 89, it was clearly and expressly held, and such is well-recognized law to-day, "that where a highway or street in a municipal corporation has been acquired by prescription, the fee remaining in the land owner, he has a right to all things connected therewith, such as trees upon or mines and quarries under the land over which the highway passes, subject only to the right of passage by the public, and the incidental right of repairing and keeping it in proper repair."

The public can only acquire an easement in the soil, timber, or materials found within the highway and *only* in such as are requisite for the building and repairing of the road. The public cannot become the owner of the soil, timber, or materials found within the highway, and cannot devote them to any other use than that of making or repairing the road. The public would have no right to transport the

materials to other roads or to interfere with them in any way which would injuriously effect the rights in them by the owner of the soil. In the case of *Cummings vs. Prantz*, 24 Mich., 514, it was held that gravel could not be removed from an alley to fill up or repair a street. In *Overman vs. May*, 35 Iowa, 89, it was held that although the public might quarry stone under a road or highway to repair the same, it could not so quarry stone there to repair another road.

Neither has the public the right of pasturage upon the highway. *No municipality or State* has power to give a right to any individual to use the land appropriated as a highway for any other purpose than that of travel, because all but this right of use remains in the owner of the land and cannot be taken from him without his consent or by the process of law. The pasturage which grows along the wayside of a public road is in no sense a necessity to the public, and there is nothing in the character of a public highway which makes it common or gives the public a right to it. A strong case to this point is that of *Cole vs. Drew*, 44 Vt., 49, *Drew's* children in passing over the public road to school were discommoded and inconvenienced by the grass making their clothing wet. He applied to the district road supervisor for permission to cut the grass, which permission was granted him, and he cut the grass and fed it to his horses. *Cole*, a proprietor adjoining the road, brought suit for the value of the grass cut and removed, and recovered judgment in the court below. The Supreme Court on appeal affirmed the judgment, and held that the owner of the soil over which a highway is located, is entitled to the enablements growing thereon and the entire use of the land, except the right which the public have to use the land and materials thereon for the purpose of building and maintaining a highway suitable for the safe passage of travelers.

These observations comprise, in the main, what I believe to be the law with reference to highways, as between the public and the individual. I do not know that the custom, *especially* in our State, is different, as nearly all questions relative to the rights of either the public or the individual have long since been decided and settled by our highest court, and the law and custom do not seem to be at variance.

As to the law of the road, a traveler may use the middle or either side of the public road at his pleasure, and is not obliged to turn out for another traveler in the same direction provided there is convenient room for him to pass on the one side or the other. The road is intended for the accommodation and convenience of all travelers, and he who starts out on a journey in a pleasure carriage has no more rights to the road than the teamster moving along with his heavy load.

It is the general custom of the country, though I do not know that it is the law, that a loaded wagon has the preference on the road, and the light wagon should be required to turn out if necessary, if both vehicles were moving in the same direction. The heavy loaded wagon, however, must not become an obstruction on the road or cause delay to the traveling public, or the teamster must not be guilty of willful or wanton delay. His duty is, and the law requires him, to move along as fast as the condition of the road and the burden of his load will permit, and not in any way or by any means prevent another team from passing him, if the person driving it desires to do so. I have often heard it said that a mail coach is privileged and that the right of way must always be yielded to it; but on an examination of the law, I find that in the case of *Bolton vs. Calder & Wilson*, (1 Walls, 360,) a case which has long since been decided, and which has ever since been recognized as the

law, that a mail coach is on a footing with other vehicles in this respect. I know of no distinction as to rights of persons in the use and enjoyment of our highways.

As to meeting on the highway the general custom of the country is, though the rule is not infallible, that the duty of persons traveling in wagons or other vehicles, meeting each other in the public road, is to pass on the right hand side of the road. I well recollect that when I was a boy, at home on the farm, and was started by my father to market or to mill, my positive instructions were, on meeting another team, to turn to the right, no matter what kind of a vehicle I met or how heavily it was loaded. I was taught that such was the law, and that a violation of this rule would be followed by heavy and severe penalty. But the Supreme Court, in the case of *Grier vs. Sampson*, 27 Penn., 183, varied the rule and held that whilst the general custom of the country for persons meeting on the highway is to pass to the right, but when a horseman or a light carriage meets a heavily laden team and can pass with safety on the left, it is his duty to give way, and leave the choice of the road to the more unwieldy vehicle.

In the case of *Beach vs. Parmeter*, 23 Penn., 196, the learned judge in the court below said, and his opinion was affirmed by the Supreme Court, "that a footman or an equestrian has a right of way as well as the driver of a carriage or a lumber-wagon." The enjoyment of this is regulated by reason. A footman or horseman cannot compel a teamster who has a heavy draught to leave the smooth beaten track of the road if there is sufficient room to pass on either side, and where a road is narrow, or there is difficulty in passing, and it becomes impracticable or dangerous for the teamster to give part of the way, and the horseman can pass by riding out of the road, it is his duty to do so; if he refuses, and a collision ensues which occasions injury to his horse, it is attributable to his own negligence or obstinacy, and he is without remedy.

The law does not require any person to do an unreasonable thing, and if the same reason and good sense is exercised by travelers on the public highway as to their respective rights in the road as they ordinarily exercise in matters relating to other affairs in life, there will be but little necessity for the adjudication of any other rights before a tribunal of justice.

As to whose duty it is to open and keep roads in repair, there can be no question. The common law has long since fixed that duty upon the road supervisor of the township through which the road passes or is located, and the statute has in no sense or manner changed that law.

The books abound with decisions of the highest court, *clearly* and *expressly* holding that the supervisors of the township through which the road passes are bound to keep the road in a safe and passable condition for the traveling public, and in violation or neglect of this duty severe penalties have been imposed. In Pennsylvania, supervisors are subject to indictment if they fail to open a road when directed by order of the court of quarter sessions of the proper county, or if they fail to keep them in a safe and passable condition for the public.

Townships, cities, and boroughs are all alike as to their duty in this respect, and are bound to make the public highways safe for the public travel, and, if necessary, for the safety of travelers, must erect walls or barriers along side of its roads or streets. In a very recent decision of our Supreme Court, it was held that where public roads running through townships are so dangerous by reason of close proximity to a declivity or precipice that common prudence requires extra precautions

in order to secure safety to travelers, the township is bound to use such precaution.

In another recent case it was held that where a person was driving over an unrailed township bridge, and the horse took fright at a plank nailed over a hole in the bridge, and, despite the efforts of the driver, backed over the bridge into the creek, by which the horse, carriage, and harness were injured, that the township was liable for the damage sustained, because the road should have been kept in safe condition. I know of no law, either common or statute, which expressly requires barriers to be built along dangerous precipices, or railings to be put up on bridges along the public highway; but municipalities and townships are required by law to keep the highway in a safe condition for traveling, no matter what the inconvenience or cost may be, and it is gratifying, indeed, to find that our courts are holding townships and boroughs strictly accountable in cases of neglect of duty in this regard, be cause human life and protection to property should be tantamount to all other considerations.

RIGHTS IN THE ROAD.

By F. H. BENNETT, Taunton, Mass.

(From the Massachusetts Agricultural Report.)

If a farm deed is bounded by, on, or upon a road, it usually extends to the middle of the roadway. There are a few exceptional cases; but ordinarily, the farmer owns the soil of half the road, and may use the grass, trees, stones, gravel, sand, or anything of value to him, either on the land or beneath the surface, subject only to the superior right of the public to travel over the road, and that of the highway surveyor to use such materials for the repair of the road; and these materials he may cart away and use elsewhere on the road, but he has no right to use them for his own private purposes. No other man has the right to feed his cattle there, to cut the grass or trees; much less deposit his wood, old carts, wagons, or other things; after notice to the owner, you may remove them to some suitable place, and if they are lost or injured, it is not your fault. The owner of a drove of cattle which stop to feed in front of your land, or of a drove of pigs which root up the soil, is responsible to you at law as much as if they did the same things inside the fence. Nobody's children have the right to pick up apples under your trees, although they stand wholly outside of the fence. No private person has the right to cut or lop off the limbs of your trees in order to move his old barn or other buildings along the highway; and even if the owner of the building has a license to move the same through the streets, this does not exempt him from liability to private sufferers. And no traveler can hitch his horse to your trees in the sidewalk without being liable if he barks or otherwise injures them, and you may untie the horse and remove him to some safe place. If your well stands partly on your land and partly outside the fence, your neighbor cannot use it, except by permission from you. Nay more; no man has a right to stand in front of your land and whittle or deface your fence,

throw stones at your dog, insult with abusive language without being liable to you for trespassing on your land; he has the right to pass and re-pass in an orderly manner—a right to use the road, not to abuse it. Perhaps it may be as well to state here, that if highways become suddenly impassable by heavy snows or deep gullies, he may turn aside into your adjoining land without being liable as a trespasser, if he does no unnecessary injury. But notwithstanding the farmers own the soil of the road, even he cannot use it for any purpose which interferes with the use of it for public travel. He cannot put his pig pen, wagons, or other things there, if the highway supervisor orders them away as obstructing public travel. If he leaves such things outside his fence and within the limits of the highway as actually laid out (though some distance from a traveled path) and a traveler runs into them in the night and is injured, the owner is not only liable to him for private damages, but may also be indicted and fined for obstructing the public highway. And if he have a fence or wall along the highway he must place it on his own land, and not half on the road, as in case of division fences between neighbors. But as he owns the soil, if the road is discontinued or located elsewhere, the land reverts to him, and he may enclose it to the centre and use it as a part of his farm.

Others may acquire a right of way over your farm in either one of the three following modes; first, by purchase or grant from you; second, by long-continued use or prescription; third, by actual necessity. As to the first method, to gain a permanent right by purchase or grant, it must have a regular and complete deed executed in the same way as a deed for the land itself. If the bargain was only oral, or if it was even in some simple written paper, but not a formal deed under seal, it would even, though fully paid for, be in law revocable—a mere license as it is called—and might be terminated at the mere wish of the land-owner, by notice to the other party to use it no longer. Being a kind of interest in land, the strict law requires it to be conveyed by deed.

2. The second mode, by prescription, requires length of time—twenty years at least; and the way must have been used continuously, peaceably and under the claim of right to do so, and not by your permission or consent. If it was only very rarely used, if it was not peaceably used, but against your protest, or if used by your tacit consent, the use would not ripen into a legal right, however long continued. And if used under all these conditions it must have been in some regular and uniform place. No man can gain a right by such means to wander over your farm just where he has a mind to, or where it suits his convenience. That would be an intolerable burden to the farmer. To gain this right by twenty years use, it is not necessary that any one owner should have traveled it twenty years. If successive owners have unitedly used it for that period, it would be sufficient, so far as length of time is concerned. And if this prescriptive right of way was only by using it for some particular purpose, as for carting wood from a wood-lot beyond, that would not authorize the person to continue to use it for all purposes after the wood had been cut off, and it had been covered with buildings.

3. The third mode, by necessity, arises when you sell a man a back lot with no means for him to get to the highway, except over your remaining land. The law gives him a right to cross your land to and fro; otherwise his land would be useless. At present he cannot reach it by balloon to any practical purpose, and therefore he must cross your land. So if you sell a man all your front land, retaining the back

part, and have no way out, except over the part sold, you retain a right of way across the lot sold, though your deed in such cases says nothing about it, and this is so even if in your deed you warrant the land to be free and clear of all incumbrances; it is a familiar maxim that "necessity knows no law."

But this right of way by necessity continues only so long as the necessity itself continues; and if a highway is afterwards laid out touching the back land on the other side, or if the owner afterwards buys a lot adjoining the highway or between the original lot and the highway, he can no longer cross over your land as before, but must go out the other way. And so long as he does have such a right he must go in such a place as you designate, if it be at a reasonable place. If you mark out a road or way along the fence or on poorer ground, he should confine himself to it. And if the way becomes mirey or out of repair he must keep it in good condition if he wants to use it. Your duty is done when you allow him to cross; you are not obliged to smooth his pathway for him or rake out the sticks and stones. But if you actually obstruct his usual road, or if it becomes suddenly impassable by natural causes, he would have a right to deviate to one side until he has opportunity to remove the obstructions. All such rights of way are apt to be nuisances to the farmers and not unfrequent it leads to litigation.

It is important to know that in whatever mode a right of way is acquired over your land, you have ordinarily a right, in the absence of any stipulation to the contrary, to erect suitable gates or bars at the entrances thereof from the highway; and if the other party leave them open and cattle get in or yours get out, he is liable to you for the damage which ensues.

THE LAW OF THE ROAD IN MASSACHUSETTS.

Chapter 93, (Page 571,) of the revised statutes of the State of Massachusetts.

SECTION 1. When persons meet each other on a bridge or road traveling with carriages, wagons, carts, sleighs or other vehicles, each person shall seasonably drive his carriage, or other vehicle to the right of the middle of the traveled part of such bridge or road, so that their respective carriages or other vehicles may pass each other.

SECTION 2. The driver of a carriage or other vehicle passing a carriage or other vehicle traveling in the same direction, shall drive to the left of the middle of the traveled part of a bridge or road; and if the bridge or road is of sufficient width for two vehicles to pass, the driver of the leading one shall not willfully obstruct the same.

SECTION 3. No person shall travel on a bridge or road with a sleigh or sled drawn by one or more horses, unless there are at least three bells attached to some part of the harness.

SECTION 4. Whoever offends against the provision of the preceding section, shall for each offence forfeit a sum not exceeding twenty dollars, and be further liable to any party for all damages sustained by reason of such offense, but every complaint therefore shall be made within three months after the commission of the offense, and every action for damages shall be commenced within twelve months after the cause of action.

SECTION 5. The provisions of this chapter shall not apply to street railways.

COUNTRY ROADS.

BY AN EXPERIENCED ROAD MAKEK.

(Republished from "Improvement of Highways" by the league of American wheelmen.)

The average condition of the country roads is very unsuitable for pleasure travel of any kind. For the latest and lightest road vehicle—the bicycle—many of them are almost impassable, even under the most favorable conditions, and the best of them are rarely smooth enough for pleasant wheeling. Any suggestions for the better construction and maintenance of our public highways may seem to come with poor grace from wheelmen, because, while asking for smooth roads, they, as a class, contribute nothing to make or maintain them, but if their advice seems obtrusive, they make this excuse, that if they pay no road tax neither do they cause any damage. A good roadway is equally beneficial to all vehicles, but theirs is the only one that causes no "wear and tear" of the road. As bicycle travel is almost exclusively confined to the summer and fall months, when such out-door exercise is most enjoyable, all that they especially desire is a fairly firm and smooth road in pleasant weather.

To provide this is now a very simple and inexpensive work, as labor-saving machinery has recently been introduced which, under ordinary conditions, is very effective. The "road scraper" or hone, mounted in a frame on wheels and geared so that it can be set to any plane and angle, will smooth off and round up a dirt road quickly and cheaply, compared with former methods. The general practice of the road-master has been to defer the annual repairs till such a time as the farmer has most leisure or inclination to work out the road tax; this would usually be late in the summer or even in the fall when the road-crust is at its hardest stage, and after being broken up and spread anew is too dry to harden again readily. Now that the "road hone" may be used, work that took a week in the fall may easily be done in a day, in the spring. Thus the road will be in the right form for summer travel at the opening of the season, instead of at its close. This would also be making the repairs at the earliest opportunity after the chief damage is done. The worst ruts and ridges are formed early in the spring when the frost is thawing out, and the ground, being loose and porous, absorbs all the rainfall till the road-bed becomes spongy and miry. When the ground has dried sufficiently to be neither muddy nor crusty, the rough ridges are in their most friable condition. They can then be planed down with the road hone with much greater ease, and the material carried into the ruts and holes, will pack and harden much better than at any other time, whether the road be chiefly clay, loam, sand, gravel, or small stones. This medium stage of dryness gives the best conditions for easy and effective work. If the work be neglected for only a few weeks, the crust may become so hard under the constant pressure of traffic and the baking sunshine that the hone can make no impression on it. If the work be deferred till midsummer or later, the "crown" will probably be worn off the centre of the road, and instead of shedding rain to each side, it will carry it along like a water course. Heavy

thunder storms often cause great damage when a road thus becomes flat or hollow in the middle. To restore the proper form when the margins become high and hard, is very laborious work, whether done with pick and shovel, or with plow and scoop. The material will not pack readily in dry weather, and the newly repaired road may for weeks be in worse condition than before it was worked. Instead of extensive repairs of this character only once a year, it would be much better to give a timely scraping as soon as practicable after the chief damage is done in the spring, and also an occasional honing after heavy rains, or whenever from any cause the surface becomes rough. One machine would be sufficient for a large district, and the times, methods, and terms of the work can be arranged on a satisfactory and permanent basis after a few years' experience. Under ordinary conditions a fair road can be maintained throughout the season with simply this occasional passage of the road hone over it. The cost would be very small compared with present methods. Of course, these machines are only suitable where the road is built up with the ordinary soil or sub-soil of the district, or with perhaps, more or less gravel or small stones in certain sections. This, however, is the ordinary structure of all our country roads, and hence this treatment will be quite generally applicable. But to insure a firm road-bed where the country is flat or the sub-soil retentive of moisture, careful draining and ditching along the roadside is necessary. To keep these open at all times and in good working condition requires constant watchfulness, as open ditches are very liable to become choked. While the simple treatment above recommended may be sufficient for rural districts under ordinary conditions, many local circumstances may render it necessary to construct certain sections in a more substantial manner. Where the sub-soil in wet weather is spongy or springy or liable to be water-soaked, or where extra heavy traffic, as in the suburbs of towns, a stone pavement of some kind may be advisable. In such cases the most common practice is to dump stones promiscuously, of all convenient sizes, along the worst portions of the road, regulate them roughly and cover with roadside dirt. Being irregular in size, rounded in form, and not well compacted they are easily displaced; the traffic soon works the smaller stones to the bottom and the larger ones to the surface; thus they cause the wheels to slip and jolt to an extent often more disagreeable than the soft mud would be without the stones. Some hints on better methods of making stone roads, therefore, may not be amiss. A stone roadway, where the stones are broken into given sizes and pounded or rolled thoroughly in to place is usually called a "macadam" road. The width, depth, and methods of construction may vary greatly according to circumstances, but in all cases the depth of structure should be sufficient to support the traffic without yielding. The stone should have sharp edges and be well packed to prevent slipping, and near the surface they should be small and uniform in size. To prevent sidewise movement under the wheels, a trench with vertical sides should be dug to the proposed depth and width of the stone structure. This will vary according to the demands of the traffic. A depth of 6 inches and a width of 15 feet may be sufficient where the foundation is good and the traffic light. If the stones are compactly placed, the surface pressure of the passing load will spread through the underlying mass in the form of a cone, with its apex at the wheel. The area of the base will increase as "the square of the depth." Thus, if the depth of the macadam stone be 6 inches, the weight on the foundation will be spread over 36 square inches. If

the depth be 12 inches, the bearing surface at the bottom will be 144 square inches. Thus the greatly increased strength of the structure due to a slight increase of depth will be readily seen.

Experience has shown that while 6 inches may be a sufficient depth for light travel, 12 to 18 inches are necessary if heavy loads must be carried at all seasons of the year. For country macadam roads the limits would be between 6 and 12 inches, according to the character of the sub-soil. For the thorough construction of macadam roads, the stones are now crushed by machinery and then rolled with steam-road rollers of 10 to 15 tons weight. The weight of the roller per square inch on the bearing surface should be equal to the expected weight, per square inch, under the wheels of the heaviest loads.

Where thorough work of the best character is wanted, engineering skill and experience are requisite, but the general methods may be briefly stated, so that wherever bad sloughs need filling up with stone, the macadam plan may be followed at least approximately. The trench or road-bed should be dug out to the required width and depth, the larger stones should then be selected and firmly packed together across the foundation in irregular courses, in the general form of a street pavement. They should all rest on their flattest or broadest surfaces, and the thin or jagged edges upward. The interstices or spaces should be closely filled up with chips and the whole layer be well rammed or rolled into a solid mass. On top of this place a layer of finely broken stone of the thickness requisite to bring the surface to grade, with a good crown in the centre. This should be rolled until the whole mass is firmly bound together and then covered with sharp gravel or fine screenings of broken stones of sufficient depth to bed and bind the layer of broken stone. In the future maintenance of such a road the most important point is to prevent the formation of ruts, by keeping the surface so uniformly even that there will be no inducement for travel to follow beaten tracks. The cost of the macadam structure precludes its use on country roads, except in occasional bad spots where stone is necessary. As a very large proportion of the country roads in many parts of Europe, in districts the most rural and secluded, are constructed with broken stone, and kept at all times in first class condition, many Americans, who have seen them, wonder why they cannot be equally common here. Such persons are apt to overlook the comparatively recent occupation of the land here and the relative sparseness of the population. But there is a much more important factor at work to prevent similar road construction here. Since the introduction of railways the country highways are used only for the most limited local business. In Europe all the fine highways were built before the invention of railways; when all travel and traffic used them and the great amount of it made such roads a necessity. Though little used now compared to former times, their maintenance in good order does not cost much and their usefulness for strictly local business is fully appreciated. In this country macadam roads will rarely extend beyond the suburbs of larger cities, and will be chiefly confined to public parks and private pleasure grounds. The methods of their construction are mentioned here simply because they may perhaps be followed to advantage on short sections of country roads, here and there, where the proximity of suitable stone to some miry stretch will make the selection of macadam preferable to any other.

COMMON ROADS.

THE PRINCIPLES INVOLVED IN THEIR CONSTRUCTION AND METHODS FOR THEIR IMPROVEMENTS.

By E. P. AUGER, C. E., *Middletown, Conn.*

(From Connecticut Agricultural Report.)

"Resistance to traction on roads results mainly from two natural causes, gravity and friction. Gravity opposes forward motion on rising grades and causes or aids to cause forward motion on falling grades, while on level grades it does neither. Friction is a constantly opposing force. To overcome the resistance of one or both of these forces and produce motion, another force must be applied, called draft. The draft applied must always equal, or, strictly speaking, it must slightly exceed the resistance of the opposing force or forces before the vehicle will move along. Gravity and friction act spontaneously in obedience to natural laws. Draft on common roads, is at present the muscular force of horses and cattle. Draft, therefore, involves a two-fold cost; first, for the animals exerting it, and secondly, for their equipment and keeping. Hence, the less the draft required on any road for a given amount of traffic, or, which is the same thing, the less the resistance of gravity and friction, the less the cost of traffic over the road."

Gravity tends to draw all bodies towards the earth's centre. This is the force which makes a cart or wagon roll down hill itself, or which necessitates a holding back force, or the use of brakes in descending steep hills with heavy loads. Gravity also occasions the extra draft required to move a load up a hill. The amount of resistance may be accurately determine when the rise of the grade and the weight of the vehicle and its load are known, it being always such a proportion of the weight as is the rise from the level of the length of road surface in which the rise occurs. Suppose a wagon which, with its load, weighs one ton, standing upon a grade of ten feet rise in one hundred feet, measured on the road surface. To move the vehicle up hill, a draft force of two hundred pounds, equal to one-tenth of the load, must be applied to overcome the resistance of gravity alone, besides an additional amount of draft required to overcome the resistance of friction. If we suppose the vehicle moved down hill, gravity tends to produce motion with the same force of two hundred pounds or one-tenth the weight.

If we suppose the same vehicle to stand upon a road of five feet rise in one hundred feet measured upon the surface, gravity will act with a force equal to five one-hundredths of the weight or one hundred pounds, to oppose or cause motion, according to the direction in which the vehicle is moved.

The resistance of gravity is the same on all roads of similar grades regardless of the character or condition of their surfaces. The wide difference in the draft required for the same load on different road surfaces of similar grade, is due to the other opposing force, friction, which will be subsequently considered.

Gravity opposes or aids traction on every road, the surface of which

risers and falls from a level. Its resistance on any given road depends absolutely upon the total number of feet of rise and fall throughout, and relatively upon the steepness of its grades. The resistance of gravity on any road can be lessened only by improving its grades. This may be accomplished by cutting down the summits and too high portions of the road, and filling in its depressions, or by changing the lay-out so as to secure more favorable natural grades. On existing roads the former course is most practicable unless the lay-out is a very faulty one in this respect.

Grading wisely done, lessens the absolute resistance of gravity by lessening the total number of vertical feet of rise or fall, up or down, which loads must be drawn. It also lessens the relative resistance of gravity by lessening the rate of inclination of excessively steep grades, and by making the necessary rise between two fixed points as nearly uniform as possible throughout.

Roads should never ascend or descend a single foot more than is absolutely necessary. In the ascent of a hill not even the smallest descent should be allowed if it can be reasonably avoided, as it would increase with the actual rise and the steepness of the hill. Nearly all the roads of the State which are hilly, are more or less faulty as to grades. They might be greatly improved under the direction of a skillful engineer or road-maker at moderate cost.

The disadvantage of steep grades is even greater than has thus far appeared. According to Emerson's mechanics, a horse as strong as five men on a level road, owing to his peculiar structure, on very steep hills has hardly the strength of three men. Gillespie gives the following table deduced from numerous experiments. Calling the load a horse can draw on a level 1.00, on a grade of

1 in 100 he can draw	0.90
1 in 50 " "	0.81
1 in 44 " "	0.75
1 in 40 " "	0.72
1 in 30 " "	0.64
1 in 26 " "	0.54
1 in 24 " "	0.50
1 in 20 " "	0.40
1 in 10 " "	0.25

Roads of steep grades are likely to be badly washed by the too great velocity of water running down their surfaces. They are also dangerous to travel when covered with ice. A steep grade is especially objectionable when it occurs in a long line of road otherwise comparatively level, because the load for the entire road must be limited to what can be drawn up the steep ascent. If a long grade of one in ten occurs in a road having no other grades steeper than one in thirty, the load must be limited to less than one-half what it can be drawn up the ordinary grades.

Every road should be perfectly level, gravity alone considered, because only such grades wholly eliminate its resistance. This conclusion is somewhat modified, however, by one or more of the following considerations. First, the proper drainage of water from the road surface requires that it should slope slightly both longitudinally and transversely. Secondly, two places are generally at different elevations, in which case the road connecting them could not be a level grade throughout. Thirdly, road improvements are limited by their cost. In sections at all hilly, roads could not be made level or of uniform inclination

without far exceeding the limit of reasonable cost. These considerations suggest the importance of determining the proper limits within which, as a general rule, grades should be chosen.

The slope needed to secure proper drainage, where the road could as well be level, involves a slight resistance of otherwise unnecessary. Hence the minimum slope should not be greater than is required for the purpose it is to serve. An experienced English engineer has assumed that one in eighty, or sixty-five feet per mile, as the proper minimum grade; while the French government board of engineers of roads and bridges established for their roads a minimum grade of one in 124, or forty-two feet per mile. The more perfect the surface the less the grade required to afford drainage. It may be assumed that roads should never have a grade less than one in 125.

The steepest grade should not exceed what is termed the "angle of repose." On such a grade the force of gravity to cause motion, is just balanced by the force of friction to oppose it. On such a grade a wagon or cart will stand at rest. Heavy loads may be drawn down such grades without crowding the horses. Accident would occur less frequently and would be less serious, if roads were no steeper than this.

In ascending such a grade, gravity and friction both oppose with equal force, and the draft is just double that required on a level grade. Horses are capable of exerting double their ordinary working power for a moderate length of time, and for a shorter time, even more than that. We may therefore assume the grade which equals the angle of repose as the maximum grade of roads. Grades which are steeper should be exceptions to the rule. The maximum grade on loose gravel roads is about one in sixteen; on common roads, in good condition, about one in twenty; on the best Telford road about one in fifty.

Gravity indirectly opposes traffic on roads of much convexity or cross-slope by tending to make the vehicle slide sidewise towards the gutter; the vehicle is usually kept in its proper place by an extra amount of friction between the wheels and the road surface, which thus adds somewhat to the draft required. This tendency of gravity on the sloping-sides of roads is seen when they are covered with ice, in slewing vehicles upon them. Roads should have no more transverse slope than is requisite for good drainage. The cross slope of earth roads should seldom exceed one in twenty. Telford adopted for broken stone roads a slope of one in thirty. McAdam gives his roads a cross slope some cases of only one in sixty.

The cross section most generally adopted by our road-makers, confirms nearly to the segment of a circle or a flat semi-ellipse. It is generally supposed that rounding up the road in this way secures good drainage. It will be seen however, that drainage alone considered, this form is objectionable. Even with this extreme roundness, the centre of the road is too flat to allow the water to run off properly, while the sides are so steep as to gully badly by water running off them. Teams invariably follow the summit of such a road, the sides being unsafe and uncomfortable to ride upon. This depresses still more the already too flat part of the road, so that the water falling on the centre of the road must run along the tracks of the wheels and horses until turned off by bars or other means into the gutters. Much of the damage of roads by water is the consequence of a faulty construction as regards the cross-section. If roads slope moderately and uniformly towards the gutters, water will drain off properly from the entire surface without and considerable damage to the road. Teams travel with equal ease and

safety on every part of such a road. Travel may be uniformly distributed over the whole surface of the road, which would prevent the forming of ruts and consequently much of the damage caused by water. As to drainage, therefore, extreme convexity defeats the very purpose it is supposed to serve.

On a convex road nearly all the wear of travel, as we have already seen, is borne by three narrow portions of the road, the tracks of the wheels and horses, in all not more than one-fourth or one-third the width of the roadway proper. The rest of the road is practically useless except in that it finds room for teams to pass each other, and for turning about. Such roads require much more frequent and expensive repairs than roads of moderate and uniform cross-slopes, owing to the unequal wear of their surfaces by travel.

The resistance of gravity, as we have seen, depends entirely upon the inclination of the road regardless of the kind or condition of its surface. The resistance of friction, on the contrary, depends upon the character of the road surface independently of its grades. The friction which opposes traction is generated partly by the axles, but mainly between the tires of the wheels and the road. It will be herein considered as occasioned entirely by the road surface.

Friction is caused by the wheels bearing upon and displacing the particles of the road surface, and by these particles rubbing against and displacing others. The more the particles of the road surface are displaced and the harder they rub against each other, the greater the friction produced. Hence roads to present the least frictional resistance to traction should be as permanently hard and smooth, under varying conditions of traffic and climate, as is possible.

Many excellent kinds of roadway are now in use, the principal of which are stone trackways, stone pavements, wooden pavements, asphalt and concrete pavements, broken stone and gravel surfaces, all of which, except the last two kinds, are too costly for country roads.

Broken stone roads are of two kinds, named respectively from the engineers who devised and introduced them, McAdam and Telford. Their main difference consists in a pavements of rough stone surface of the Telford road.

The stone for the surface of either should be both hard and tough and should be broken so as to pass through a ring two and one-half inches in diameter. Basaltic or trap rocks are the best; sienite or granite next; limestones next. Sand stone, if soft, and clayey stones, should never be used for roads. The thickness of the McAdam road, which is made wholly of broken stone, should be from six to twelve inches, according to the amount of traffic and the nature of the road bed. The road should be first suitably graded and properly arranged to secure good drainage, after which the stone may be applied in layers not exceeding three inches in thickness. Each layer should be somewhat compacted with a heavy roller, or by travel before the succeeding layer is applied. The Telford road consist of a pavement of rough stones set on their broadest edges or ends, lengthwise across the street. The thickness of this pavement should be from seven to nine inches at the centre, and from three to six inches at the sides. Fragments of hard stone should be wedged into the openings on top of the pavement with a light hammer, after which the tops of stones projecting above the pavement should be broken off. The broken stone may be applied the same as on a McAdam road, but need not be as thick, six inches being ample for country roads. Of the two, Telford roads are generally con-

sidered by engineers and intelligent road-makers the better. The Telford pavement makes a firmer and more durable road and prevents the earth beneath, softened by receding frosts or otherwise, from pressing up among the broken stone. It also affords a kind of under-drainage, and allows the use of larger and less expensive stone in the bottom of the road.

The leading principles regarding broken stone road surfaces are, first, that the stone must be somewhat broken into angular fragments before they can be firmly compacted together; secondly, that only small stones should be used near the surface of the road as the force of the wheels or the hoofs of the horses striking eccentrically upon a large stone would loosen it and the smaller stones about it from their places, thus preventing the road from becoming solidly compacted together.

A Telford road twenty-five feet wide, properly constructed, would cost from twelve to twenty dollars per rod, unless stone were near at hand and somewhat broken. This comparatively large cost will prevent their being brought at once into extensive use for country roads. The Telford road may be used with great advantage in those portions of the highways which are frequently sloughy and difficult, even before they are adopted for extensive use on long sections of roads. Since broken stone roads are necessarily quite expensive, no thoroughness should be wanting in their construction. The maxim "what is worth doing at all is worth doing well," is especially true in the construction of broken stone roads.

A road should not necessarily be wide, as every needless foot of width adds nearly one-eighth of an acre per mile to its area and increases proportionally its original cost, beside somewhat adding to the expenses of keeping it in repair. Outside of cities and villages twenty-five feet is sufficient for the width of roads of the most traffic. Roads of ordinary travel should be about twenty feet wide; for others of still less travel, fifteen feet is ample width.

Whether any proposed roadway improvement should be made or not depends finally upon the ratio between the annual interest of its cost and the yearly benefit to traffic to result therefrom. When such benefit exceeds the interest on the cost, the proposed improvement may be made. If the annual benefit to be derived from any proposed improvement of the road is less than the interest of its cost, the improvement should be made less extensive, until the benefit to result from it will exceed the interest of its cost. If this cannot be done the plan must be abandoned. Great care should be exercised to guard against any error which would result from prejudice in favor of the improvement. If any doubts exist as to the advantage, the doubt should be against making the improvement, that the estimate may be relied upon in its favor."

EXTRACTS FROM THE REPORT OF THE COMMITTEE ON ROADS.

(Read before the Engineers Society of Western Pennsylvania.)

"To the farmer, the market simply means the nearest railway station. If he is located ten miles distant from the railway, the character of the road often requires a whole day's labor with a team of horses to trans-

port 600 or 700 pounds to the station. It never occurs to those who lay out and construct roads, what loss this extravagant use of horse-power involves. Land at the railroad may be worth \$100 per acre, while the same kind of soil ten miles distant may not be worth more than one-third of such an amount. If he could traverse the ten miles in less time and with three times the load, the farmer could market his produce with one-third the number of trips, and the time and expenditure of power lost on the road could go to the betterment of his farm. He would live better, have more comforts, and be able to have better schools for the education of his children.

Good roads mean another thing to the farmer, an improved breed of horses. If the farmer's sons have good horses, and good roads to exercise them on, they will form an attachment for the country which no allurements of the city can detract from. As it is, however, the farmer's sons grow restless with the plodding ways of their fathers and seek opportunities to emigrate. It is no wonder, for what use is the school and education, except to advance ideas of comfort and happiness; and there can certainly be no general happiness in a district where the roads are so bad that for months at a time the people can see nothing of their neighbors."

"The salient points of the law which your committee would like to see enacted, should provide for three things being done in connection with the roads.

1. As to location. It is too often the case that great detours are made by the township roads to avoid cutting the farm of some influential citizen in two. It is regarded as a terrible affliction by them to have to open two gates to reach a field with a mowing machine, where one would do. The property, it is claimed, will not divide up so well when the farmer is dead. For these and similar reasons all the other farmers and the travelling public must forever pay a tax in the form of lost time and wasted horse-power for every load hauled around his premises. There are many thousands of these "toll gates" on the 90,000 miles of roads in the State. The very farmer who maintains one such taxing station on his property and thinks he has gained a point, loses, in going to market, more than he has gained, by paying similar tolls to others equally favored."

"The second point to which legislative attention is requested, is in the construction of the roads. It should be the aim of the law to encourage the construction of well-drained, macadamized or graveled roads. On this point it is scarcely worth while to discuss the engineering points involved. They are for the main part, simple enough, though no one plan may be applicable to all portions of the State. When we speak of macadamizing roads, we do not urge the construction of too many at one time. Certain main roads, however, we believe should be designated for improvement first, and the worst places of these should be undertaken first."

"Your committee believe there are prominent roads in every county, connecting important towns, which should be first radically improved. Now it often happens that such a main highway may traverse a very poor township, or be for miles near one end of the township to which it confers but little benefit. Hence the propriety of taxing the larger community, the boroughs, and in fact the county, for certain classes of roads. The boroughs and cities are just as much interested in having good roads leading from them, as are the farmers who use them. This we believe is a self-evident truth; nevertheless, it is not the law in this State to permit cities and boroughs to help pay for good roads."

"We are therefore confronted with the question, shall our main country highways be improved with the funds obtained from a county tax, and built under county supervision, or shall they remain, as heretofore, under laws affecting townships only?

"A second class more especially useful to the citizens of a local rural district, which might be termed township roads, may continue to be constructed and maintained under township control so far, at least, as to the amount of money to be expended upon them. We have faith in the notion that when the advantage which will accrue to the people by improved country roads is seen and appreciated, the cross-roads will likewise be improved in a good substantial manner."

"The third point which we think should be cared for in the contemplated legislation, concerns the maintenance of the roads after completion. We think that it can be easily shown that for the average amount of travel which the proposed macadamized roads will be called upon to bear, that the cost of their maintenance will be less of a tax upon the community than is now borne annually in so-called "road-repairs." It, however, would be taking but a narrow view of the case to assume that this is the chief advantage of having good roads, viz, to keep down taxes for renewal and repairs. Increase of taxation in some shape seems inevitable to keep pace with every march towards improvement. But very fortunately, with every march of improvement come sources of revenue, which more than compensates for the increase of taxation. At all events, it is certain that we cannot have good roads without paying for them."

"The difference in cost of hauling the tonnage over good roads and over bad or indifferent roads, is an actual expense which the community encounters continuously without fully appreciating its magnitude, but which is a legitimate subject of inquiry. From Morin's experiments, made many years ago, and which are still recognized as the highest authority on the subject, the following table has been prepared, showing the average loads which each horse can draw over different kinds of road-surface, and on grades rising ten feet per 100, five feet per 100 on a level:

KIND OF ROADS.	GRADE.		
	10 per cent.	5 per cent.	Level.
	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>
Street pavement, dry and clean,	1,090	1,920	8,300
Street pavement, muddy,	1,040	1,800	6,250
MACADAMIZED ROADS.			
Best condition, dry, clean and smooth, . . .	1,060	1,840	6,700
Good condition, moist with little dust, . . .	1,000	1,000	4,700
Bad condition, ruts and muddy,	890	1,390	3,000
Very bad condition,	740	1,040	1,840
CLAY ROADS.			
Best condition,	930	1,500	3,600
Average condition,	660	900	1,400
Newly worked, not muddy,	600	780	1,100

The legal grade of five degrees is equal to 8.85 per 100, and a load of one horse on that grade would be respectively, 1,150, 1,090 and 700

pounds for pavement, macadam and clay roads, each in good average condition.

From this it will be observed that as the steepness of the grade increases, the efficiency both of the horse and of the road surface diminishes; that is to say, the more the horses energy is expended in overcoming gravity, the less remains to overcome surface-resistance. For average conditions of each class of road, the loads hauled are in the following proportions, taking that of the clay road as one:

	Macadam.	Pavement.
On level,	2.75	4.46
On 5 per cent. grade,	1.70	2.00
On 10 per cent. grade,	1.43	1.58
On legal grade, 5 degrees,	1.56	1.64

The last census report gives the total quantities of the agricultural products of the State in 1879. Converting these quantities into equivalent weights (omitting orchard and garden products which are given only in value and not in quantity) it appears that the total farm products amounted to 6,500,000 tons. Of this amount about one-half is consumed upon the farm, and the other half or 3,250,000 tons, must be hauled by wagon for distances varying from one-half to ten miles. The average haul is probably not less than five miles.

We will assume that the haul is five miles and that two loads per day are made by a two-horse team at a cost of \$2.50 per day. The cost of moving the total market crops will be as follows, both in average condition and with legal grades:

	Clay road.	Macadam.
Load for two horses,	1,400 lbs.	2,180 lbs.
No loads for 3,250,000 tons,	4,643,000	2,981,000
Cost \$1.25 per load,	\$5,703,750	\$3,726,250
Difference,	\$1,977,500	

This is an excess cost annually entailed upon the farm products by clay roads, as compared with turnpikes. It is enough to keep 30,000 miles of turnpike in repair at an annual expenditure of \$66 per mile.

Looking at it another way, the figures given above represent 2,321,500 days work for a man and two horses on clay roads as against 1,490,000 on improved roads, a loss of 831,000 days labor, which might be devoted to other useful purposes. Besides the farm products there is quite a large tonnage of other materials such as merchandise, machinery, coal, manufactured articles of all kinds, including farming implements, &c., which must be carried to towns not reached by railroads, or to the homes of the people in the country districts. We have on hand no data from which to estimate the amount of this tonnage, but it must be large, and swell the aggregate loss to the general community to nearly double the sum already estimated, or say, \$4,000,000."

But the diminished cost of hauling is not the only return a community derives from good roads. At certain seasons of the year, the clay soil of this State becomes impracticable for loaded vehicles. As a result of this, the crops must be marketed when the roads will permit, and this in turn produces a glutted market with prices at the lowest ebb. Perhaps a few days or weeks later, a change in the weather breaks up the roads and the honest farmer is compelled to sit at home with folded hands, while the prices of his products go steadily higher and higher.

With good roads this is all changed. The market is always access-

ible and prices are not sent away down because every one can get there, nor away up because no one can. One active cause of fluctuations is eliminated, and the range of fluctuations is reduced to narrower limits. With bad roads the great bulk of farm products are sold at the lowest prices; with good roads, at *average* prices, while to each individual is opened the possibility, by the exercise of some discretion of reaching the market when it is highest.

The amount of hard cash which the farmers of Pennsylvania lose every year in this way is difficult to estimate, but it must be enormous. Take the single item of the hay crop, which in the census year amounted to 2,811,517 tons. Of this the greater part (say two-thirds) was consumed by the farmer's stock, and the remainder (940,000 tons) was hauled to market. For the purpose of illustration we will assume that the price of hay has ranged between \$10 and \$15, and that owing to the condition of the roads 800,000 tons had been sold at the lesser price, and 140,000 tons only obtained the higher price. The total sum then realized by the producers would be \$10,000,000, or an average all around of \$10.74 per ton. But with good roads the supply would have been more evenly regulated to the demand; the lowest price would not have been so low nor the highest price so high, and there would have been less difference in the quantities sold at the extreme prices. To carry out this illustration, suppose that 500,000 tons had been sold at \$11, and 400,000 tons at \$14. The total result would then be \$116,600,00, or \$12.36 per ton. The gain to the producer being in that case \$1,560,000 or quite a snug sum lost on a single item of farm product.

While these figures are not based on actual data, they are not beyond the range of possibility, and serve to show that the actual cash loss sustained by the farmers of the State through bad roads, probably amounts to several millions of dollars every year. To estimate this at \$6,000,000 would certainly be much too low, and yet \$6,000,000 is 6 per cent interest on \$100,000,000 of invested capital.

Returns for investments of this kind are had also through another channel. It is found as a direct result of the construction of good roads, that property is enhanced in value. Farming lands situated on or near the line of a good turnpike always find most ready sale at prices ranging from 25 to 50 per cent. higher than equally good lands similarly situated but not accessible by turnpike."

Building a turnpike does not make the adjoining lands produce larger crops. It enables these crops to be marketed at a better price and less cost. If, then, a farmer finds that he can afford to pay 50 per cent. more for farms which have a turnpike out-let to market, is it because on account of the cheapened cost of hauling and better command of the market he is able to add more than 50 per cent. to the income derived from the farm.

In those portions of Ohio which have taken advantage if the statutes provided, 50 per cent. increased value is not uncommon, and 25 per cent. is the least estimate placed upon such difference of location. Moreover the people of these sections would not be deprived of their road at any price; nor would they consent, under any circumstances, to go back to the old system of mud roads. They pay their road tax in cash cheerfully, and without any longing for the annual pic-nic commonly called "working the roads," which they formerly regarded as an inestimable right, and a glorious holiday second only to the Fourth of July and Christmas.

Any enterprise which reduces the cost of transportation of crops and

merchandise 40 per cent, adds to the annual income an unknown large per cent., and increases the value of land 25 to 50 per cent., should commend itself to the self-interest of every farmer in the State. It would be difficult to devise any scheme that would contribute so largely to the general prosperity as large and immediate outlay, judiciously expended in the construction of first-class roads.

"The road tax annually collected in the county of Allegheny amounts to about \$140,000, and for the entire State, according to the best estimate obtainable, it amounts to the enormous sum of about \$4,000,000. What have we to show for it? What a comment on the present inefficient methods these figures afford, in view of the condition of the roads at the present time."

RESISTANCE OFFERED BY DIFFERENT ROADS.

From Municipal Engineering by LEWIS M. HAUPT, C. E.

"Again, looking at the surface covering from an economic standpoint, let us see how the power required to move a given load is affected by the resistance of the various kinds of pavements.

By sand is $\frac{1}{2}$ or 20 per cent. of the weight of the load, or 400 pounds per ton.					
" gravel it is $\frac{1}{10}$ or 10 per ct. of the weight of the load, or 200	"	"	"	"	"
" an ordinary earth road it is $\frac{1}{10}$ th	"	"	or 200	"	"
" hard, dry clay or earth, $\frac{1}{20}$ th to $\frac{1}{30}$ th	"	"	or 100 to 66	"	"
" cobblestones, ordinary, $\frac{1}{4}$ th	"	"	or 250	"	"
" good " small size, $\frac{1}{15}$ th to $\frac{1}{30}$ th	"	"	or 133 to 66	"	"
" ordinary macadam, $\frac{1}{25}$ th to $\frac{1}{35}$ th	"	"	or 80 to 57	"	"
" best French " $\frac{1}{50}$ th	"	"	or 40	"	"
" ordinary stone block, $\frac{1}{25}$ th	"	"	or 80	"	"
" " Belgian " $\frac{1}{10}$ th	"	"	or 50	"	"
" well laid " " $\frac{1}{60}$ th	"	"	or 33	"	"
" asphalt in sheet form, $\frac{1}{133}$ d,	"	"	or 15	"	"
" smooth granite trams, $\frac{1}{16}$ th,	"	"	or 12	"	"
" iron tramways, well laid, $\frac{1}{200}$	"	"	or 10	"	"

If, for purposes of comparison, it be assumed that it requires one horse to move a ton on an iron tramway, then we find that to perform the same work on the other surfaces there will be needed, for asphalt $1\frac{1}{2}$ horses; for well laid Belgian block, $3\frac{1}{3}$; for ordinary Belgian, 5; for ordinary stone block, 8; for macadam from 5.7 to 8; for good cobbels from 6.6 to 13.3; for ordinary cobbles 25; for a good earth or gravel road, dry, 20; and for sand, 40 horses. That is, to move the same load at the same speed and for the same length of time, with the same fatigue to each horse, requires, for *ordinary cobble stones* 25, and for *stone block pavements* 8 times the number of horses necessary for iron trams, while for asphalt only $1\frac{1}{2}$ are required. The great economy of smoothness, therefore, becomes at once apparent, but it is evident that, as in all lines of transportation, the greatest resistance regulates the load over the rest of the route, unless there be auxiliary power, so the continuity of the surface should remain unbroken by any other grade of material which would increase the resistance. It is estimated that if New York were paved throughout with asphalt, "the traffic that now costs \$15,000,000, would be done for a fraction of that sum," and that at least \$1,000,000 more could be saved in repairs on vehicles and for horses annually.

THE IMPROVEMENT OF COUNTRY ROADS.

From the annual message of Gov. David B. Hill, of New York, to the State Legislature, January 7, 1890.

The subject of the improvement of county roads is one which is attracting wide-spread attention. The facts exists that our highways in the rural districts are, as a general rule, in an unsatisfactory condition, many of them being almost impassable without great discomfort during large portions of the year, while few are kept in a proper state of repair. They are far inferior to those throughout England and several other countries in Europe, while the public roads in the New England States are conspicuously better than ours.

This situation may have arisen because of our vast expanse of territory, the effort to maintain too many highways, the large expense involved in their proper care, inattention and indifference on the part of the people, or possibly from defective system of highway laws. Whatever may be the real cause, it can not be denied that our highways are deteriorating, and that some adequate remedy should be devised. It is apparent that they are not constructed with any special skill, little or no engineering talent being employed, and the matter of culverts and drainage being largely overlooked. It is asserted by some that the present system of permitting each free holder to "work out" his road taxes operates badly, and being a relic of old times, might be essentially modified with beneficial results. There seems to be a lack of official responsibility and competent supervision. Neither commissioners of highways nor pathmasters are always selected for their especial fitness for the discharge of the important duties involved in the proper construction of suitable highways or in their care and maintenance. In some of the western States these duties devolve upon a county civil engineer, who has entire charge, and whose functions are performed for the benefit of the whole county, freed from local influences and interests.

When highways are once properly built the inexpensiveness of their proper maintenance is not generally understood; but the principal difficulty in the past has arisen from their originally defective construction. Country highways running through a town should not be regarded as principally for the benefit of that town. That may be their primary object, but they serve a broader and more comprehensive purpose in affording means of communication for all the people, and should be viewed as a part of a great general system. The burdens imposed upon the tax-payers in the country are conceded to be onerous and various, and it can not be reasonably expected that they will manifest an unusual interest or a large degree of pride in the maintenance of superb and expensive highways to an extent beyond the actual needs of the immediate neighborhood.

But the required improvement of our highways should not be considered in any narrow or selfish spirit, nor should local interests alone be consulted. The interests of the whole State are involved. This aspect of the question naturally presents the inquiry whether the State itself should not take the lead in the matter of so pressing and desirable an improvement.

It has been suggested that the State should proceed to construct through every county two highways, running in different directions

and intersecting each other in about the centre of the county—such roads to form a part of a complete general system, those in each county to connect with those of adjoining counties, and to be known everywhere as State roads, constructed, cared for and maintained at the expense of the State at large, under the direction and supervision of the State engineer and surveyor or other competent authority to be designated. This system, when once completed, would enable a person to start from New York city, Albany or any other point, on foot or in carriage, and visit every county in the State without once leaving the State roads, thus insuring comfort, convenience, pleasure and speed. These roads should be macadamized or constructed of crushed stone or other suitable material, with proper culverts, good bridges, adequate drainage, watering-troughs and sign-boards, so as to compare favorably with the best country roads in other countries; and existing highways could be utilized for this purpose so far as feasible.

These State roads would not only prove of great convenience and vast advantage to the whole community, but they would serve as "object lessons" to the local authorities, the effect of which would necessarily tend to improve the ordinary town highways and prove of inestimable benefit.

It is not believed that the people of the cities of the State would object to this improvement, but that on the contrary, they would hail it with pleasure, as during the summer months they flock to the country in large numbers and are deeply interested in all that concerns the material progress, development and prosperity of the rural districts.

In the early history of the State it was the custom to construct important public highways at general expense. The session laws from 1812 to 1831 contain many acts making liberal appropriations for such purposes; but after the building of our canals and railroads the practice was discontinued.

Our free canals are maintained at an expense of over a million dollars annually, and the State at various periods in its history has financially aided the construction of certain railroads. Some interior counties have been heard to complain, possibly not without some reason, that those improvements have not materially benefited their particular localities, but the plan here outlined would to some extent lighten the burdens to which they are now subjected, or at least tend to equalize them.

It is realized that the project here suggested would require many years to fully carry out, and the outlay of a vast sum of money; but the State is practically out of debt, and it is believed that there are no constitutional objections to be overcome, and before any debt is contracted for the purpose, the question of the propriety of the expenditure should be submitted to the people of the State, under the provisions of section twelve of article seven of the Constitution. The subject is of sufficient importance to merit the careful consideration of the Legislature.

THE PUBLIC ROADS OF BADEN, GERMANY.

(From the Massachusetts Agricultural Report.)

The report of the chief engineer of the department of "Roads and Hydraulic Engineering," contains the following:

"In Baden the condition of the roads has been a subject of great

care. Within the last forty-five years, many millions have been spent upon them, and experience has shown this expenditure to be one of those most advantageously spent. As most of the roads are well laid out and as there are plenty of them, there remains now mainly, the keeping in repair of the roads to be attended to and not to build any new ones. Our endeavor now is, to do this at the minimum of cost. Statistics gathered on this subject, shows good results and points out to us the means of arriving at still better ones. The present road law was made in 1810. That part of the old law which relates to the maintenance of roads is still in force, but that part requiring labor as road tax was abolished in 1831, and likewise most of the road police regulations. The appropriation for roads has been increased 250,000 florins to pay for the abolished road-tax labor, and to make up 170,000 florins previously received from tolls which were abolished in 1831. The system now is as follows: All town roads are taken care of by the towns. The State merely appoints and pays a road-master so called, who superintends fifteen or twenty road keepers, and reports on the state of the roads, the reasons for their bad condition, if that be the case, what is needed, &c. The law for the second class or county roads was formerly, that they were of importance to several towns, they had all to help maintain the same. As this gave rise to continual bickering and quarreling, in which the road suffered most, it was changed in 1856. They are now taken care of under the direction of the State and paid for partly by the State and partly by the towns in which they are situated. Most of the roads under this head are those which have risen up in importance since the building of railroads, and are generally those that lie perpendicular to the direction of the railroad they are influenced by. The towns not having the means very often to properly improve and repair such, it was found necessary and expedient to give them the aid of the State, and in order to procure the necessary funds, all roads that are run parallel to railroads and all those that had lost their importance by the construction of railroads, were in 1855 stricken from the list of State roads. These latter, as the name implies, are wholly under the care and kept up at the expenses of the State.

In 1835 the total length of the State roads was 1,430.8 English miles.

In 1855 the total length of the State roads was 1,500.8, English miles.

In 1855, by excluding several State roads, this last length was reduced to 1,142.4 English miles.

In 1861 it has increased to 1,190 English miles.

In 1835 the length of the second class roads (the repairs partially paid by the State) was 467.6 English miles.

In 1861 their length was 630 English miles.

So that the State had, in 1861, 1,820 English miles of roads to maintain, the town helping to pay on 630 miles thereof.

The statistics of the road repairs are kept in the following manner:

The road-keepers are required to keep a record of all draught animals that pass in either direction. Horses that are being ridden, animals not before a vehicle, and teams going to or from the field, are not counted. These records are kept only during working hours. Likewise, not during the whole year, but only for four months in each year, so selected as to give an average amount of travel. The travel on the road on Sundays, and out of working hours is taken from a few observations; it is a very small percentage of the whole. At the end of the year these records and observations are collected and graphically described on a map of the whole State. The different roads are drawn of

a different thickness of line, according as the amount of travel on them is greater or less. The quantity of road metal used per yard of road, and the kind of metal used, give the data for another such map, in which the different colors of the roads represent the different materials used in their repair and the figures on them, and their thickness show the number of cubic yards per mile required to keep the road in order.

Finally we have a third map, which indicates, by the thickness of the several lines representing the roads and by the figures on them, the total cost per mile of repairing the road one year.

DUTIES AND POWERS OF ROAD SUPERVISORS.

An opinion by Hon. HARMAN YERKES, P. J. Court of Common Pleas, of Bucks county, Penn'a; delivered March term 1889; Opinion filed August 13, 1889—From the *Court Gazette*.

In the Matter of the Appeal of Moses Vandegrift from the Decision of the Auditors of Bensalem, in the Settlement of his Accounts as Supervisor of said Township.

OPINION OF THE COURT.

Upon the demand of certain tax-payers of Bensalem township, for an opportunity to work out their road taxes, the appellant, who was the supervisor of the township, entered into a contract with them for making "a good and substantial road-bed" upon a specified part of the highways of the township, "either by macadamizing the same, or by the use of stone and gravel, or in such other way as shall be deemed advisable and proper, and make and construct a road and highway so that the same shall be a permanent benefit to the township."

The work was to be done under the inspection and subject to the approval of the supervisor.

The work appears to have been done to his satisfaction, and the cost thereof was claimed as a credit against the amount charged to him upon the township duplicate. The cost, according to the contract, equalled the amount of taxes due to the township from the tax-payers with whom the contract was made.

The exact reason for the decision of the auditors, disallowing the claim of the supervisor, does not clearly appear. It is not denied that the work was performed, nor is it alleged that when done it was of such an extraordinary character as would show that the supervisor exceeded his powers in making the contract, or in allowing the tax-payers to work out their taxes in the manner provided therein.

We presume that the claim was rejected on the sole ground that, upon its face, the contract was illegal and unwarranted by the authority vested in the supervisor. The law expressly provides that the public roads or highways shall be effectually opened and constantly kept in repair, and at all seasons be kept clear of all impediments to easy and convenient passing and travelling. And to that end the supervisors are enjoined and required, at the expense of the township, to purchase wood, timber, and all other materials necessary for the purpose of making, maintaining and repairing the public roads or highways, and to employ, oversee and direct a sufficient number of laborers to execute promptly and effectually the provisions of the law. And they may also

enter upon lands or enclosures to dig, gather and carry upon said roads stones, sand or gravel which they may think necessary for the purpose of making, maintaining or repairing the said roads, when the same can not be conveniently obtained by contract at reasonable prices.

The statute thus defines the duties and powers of the supervisors:

It contemplates that the roads shall be kept in permanent repair; that wood, stones, gravel and sand shall be used for such purpose, and that the supervisor shall, when it can conveniently be done, make contracts for such repairs. Of course, he cannot make his contract in such a manner as to deprive any tax-payer of his right to work out his own taxes.

The contract in evidence is clearly within the law, and is such as the supervisor had the right to make. It was in the line of his ordinary duty to provide for the performance of the work, which is the subject matter, according to his best judgment, so long as he did not deprive the other tax-payers of the township of their rights. The contract did not infringe upon those rights, because it did not exceed in amount the taxes of the persons with whom it was made.

It was also for the making of such a road as the law contemplates, and of the materials mentioned by the act. It is true it might result in making a better character of road than is usually provided by the ordinary supervisor, but not better than the statute intended should be made. This is because, ordinarily, the supervisor fails to perform this duty in the manner pointed out by the statute.

Instead of making such improvements to the roads as will keep them constantly in repair, and at all seasons clear of impediment to easy and convenient travelling, it is usual for the supervisor to make a pretence of repairing the roads by throwing upon the hard bed, from the side ditches, loose earth, unbroken, rolling stones, bogs, and whatever other material, suitable or unsuitable, may be found in the ditches along side, without reference to the condition of the road or the necessity for repairs or filling up.

The consequence is that often good roads are made worse, if not nearly impassable, for a season, while poor ones are neglected, simply because the immediate side ditches do not furnish suitable materials to repair them with.

This short-sighted and too often useless system of repairing roads, is frequently approved by the tax-payer, for two reasons. First, because supposed to be inexpensive; and second, it permits him to work out his taxes without being required to furnish valuable material or to provide the better labor that a different method would demand.

But it is really both expensive and wasteful. It is expensive because not lasting. Much earth is thrown out where it is injurious, rather than beneficial, and it is soon washed away or ground up into quicksands, necessitating a repetition of the same ineffectual work.

The method thus commonly practiced on our roads is not the lawful one. It is but temporary, whereas the law requires that the work shall be effectually done, and of a permanent character, so as to keep the road in "constant repair."

If, instead of this ineffectual method, a portion of the highway of each township, where most needed, would each year be put in a state of permanent improvement, with such temporary repairs only as are needed to other portions, in a few years the same expenditure would result in establishing a system of safe, good and permanent roads, which would not require half the expenditure incurred by the system now practiced.

We think the conduct of the appellant showed a purpose to comply with the law, and to build the road well and as directed so far as he went. The same good judgment would, another year, improve other roads in like manner, and eventually the township would be greatly benefitted.

Instead of being condemned and put to loss, he deserves to be commended for good sense and judgment; and, as it is not alleged that he showed favoritism, it is difficult to understand the purpose of the auditors in refusing to allow him a lawful credit.

And now, to wit, August 13, 1889, the appeals is sustained, and the proceedings of the auditors of the township of Bensalem set aside, so far as they refuse to grant appellant exonerations for the road taxes for the year 1889, charged, assessed and levied against Craig Biddle, trustee of the estate of Jane M. Biddle; Beauvean Borie, for the estate of Charles L. Borie; the estate of Dr. George Fox, Thomas Harrison, Catherine Whelen and Edward S. Whelen, tax-payers of said township. By the Court.

THE FREE TURNPIKE LAWS OF OHIO.

FREE TURNPIKES.

(Chapter 6, page 1168, Vol. II, Revised Statutes of Ohio.)

SEC. 4758. The county commissioners of any county, when they become satisfied that the public interests of their county demand and justify special action for the improvement of the roads therein, may appoint three disinterested freeholders of their county as commissioners to view, survey and locate one or more roads, beginning at and leading from the county seat of the county, or such other and eligible points as may be deemed proper, and running by such direct and eligible route as they may find best for the public convenience, and terminating at any point within or at the county line; but they are not authorized or required to construct or maintain any such roads within the corporate limits of the town or city where the county seat is located, when, according to the last federal census, more than one thousand inhabitants are contained in such corporate limits.

SEC. 4759. The roads established and constructed under this chapter shall be opened not more than sixty nor less than forty feet wide, and at least twenty feet in width shall be turnpiked with earth so as to drain freely to the sides, and raised with stone or gravel not less than ten nor more than sixteen feet in width, nor less than twelve inches thick in the centre, and not less than eight inches thick at the outer edges of such bed of stone or gravel, well compacted together in such manner as to secure a firm, even and substantial road; but the commissioners may, in their discretion, cause the road to be constructed wholly of earth, when stone or gravel is not accessible to the line of the road; in no case shall the grade of ascent or descent on the road be greater than seven degrees; the road shall be well provided with all necessary side drains, waste-ways and under draining, to prevent overflowing or washing by water, and with substantial bridges or culverts at all crossings of water-courses, and such roads shall be free to the public for travel.

SEC. 4760. The county commissioners may authorize the commissioners by them appointed to call to their assistance a competent sur-

veyor or civil engineer, or both, at their discretion, with the necessary and proper assistants, and to lay out, survey and locate such turnpike road, through or upon any improved or unimproved lands, on the best route between the points of beginning and termination, and to obtain by grant or take propositions for the purchase from the owners of land over which the road will pass, the right of way, and to take timber and other materials necessary to the construction and repair of the same.

SEC. 4761. When said commissioners and the owners fail to agree as to the amount of compensation, or when the owner is unknown, non-resident, or incapable of contracting, then the same shall be ascertained and adjusted by proceedings had in the name of the county commissioners, under the law providing for the appropriation of private property by corporations; and the commissioners may authorize the viewers or commissioners by them appointed to locate the road upon the whole or any part of any State, county or township road heretofore laid out and established within the county, and to widen, alter, change or vacate the same, or any part thereof, subject to the rules as to compensation for property appropriated as aforesaid.

SEC. 4762. Before determining upon the location or establishment of such a turnpike road, the county commissioners may require donations of money and written agreements on the part of tax-payers of the county subjecting their taxable property to taxation annually, to aid in the location and construction of the same during the term of years named therein, and at the rate therein specified, which agreements shall be filed and recorded in the office of the county auditor, and from the time of such filing and recording shall operate as a lien upon the real estate of the several parties joining therein as donors for the purpose therein provided; all revenues derived from donations in money and taxation shall be kept and held as a separate fund in the county treasury, and shall be applicable only to other purposes of locating and constructing such turnpike roads, and if the commissioners determine not to establish and construct such roads, then any money received as donations shall be refunded, and the agreements for donations by taxation shall become inoperative.

SEC. 4763. The commissioners shall not levy any general tax, nor appropriate any money, except so far as may be necessary to pay the expense of preliminary surveys already commenced, or any other liabilities already incurred, to be expended in the construction of such turnpikes, without first submitting to the qualified voters of the county the question as to the policy of constructing such roads by general tax, which submission shall be made at any annual spring or fall election; and the commissioners shall cause public notice of such vote to be given by publication in all the newspapers printed and of general circulation in the county, and also by causing hand-bills to be posted up at the usual place of holding elections in each township and ward throughout the county, at least fifteen days prior to such election.

SEC. 4764. The judges of such election in the several townships and wards in any county in which such question is submitted, and such notice given, as aforesaid, shall open a poll for taking such vote, receive and count the ballots cast, and within three days thereafter return to the auditor of the county a full and correct abstract of the votes, and shall in all respects be governed by the laws regulating general elections, and be entitled to the same compensation for returning the poll-books which shall be paid out of the county treasury on the order of the auditor; and the poll-books so returned shall, within five days from

the day of holding such election, be opened, and the votes counted by the commissioners and auditor of the county and a correct statement of the result shall be kept by the auditor on file in his office for public inspection.

SEC. 4765. If at such election a majority of the votes so cast be against the policy of constructing such turnpikes, the commissioners shall not assess any tax for that purpose, but they may, on petition of not less than one hundred tax-payers of the county, again submit the same question at any regular annual election either in the spring or the fall, to the qualified voters of the county, notice of which shall be given and the election conducted in all respects in the manner prescribed in the two preceding sections.

SEC. 4766. If at any such election a majority be found in favor of the construction of such turnpikes, the commissioners may proceed to levy taxes, issue bonds and appropriate and expend money in the construction of such turnpike roads, as in their judgment may be necessary to the public convenience and promotive of the public interest.

SEC. 4767. When the county commissioners receive or require donations of money, or written agreements on the part of tax-payers subjecting their taxable property to taxation annually, to aid in the location and construction of such roads, and a majority of the tax-payers within the boundaries of the road sign such subscription or agreement, the commissioners shall thereupon be authorized to levy the amount thereof upon all the taxable property within the boundaries of the road, according to the benefits to said property, taking into consideration any assessments that have been heretofore made, and the boundaries of the road shall not be taken to include any property that does not lie within two miles of such contemplated improvement.

SEC. 4768. Upon the location and establishment of any such turnpike road by the county commissioners, and after an affirmative vote by the electors, they may for the purpose of aiding in the construction, and to provide a permanent fund for the maintenance and expense thereof, levy annually, in addition to other road taxes authorized by law, a tax for turnpike road purposes of not more than four mills on the dollar of valuation on the grand duplicate of taxable property in the county, and to continue such levy from year to year, until the road or roads which have been commenced are completed.

SEC. 4769. No such taxes shall be levied on any lands which have heretofore been assessed for the construction of any free turnpikes or improved road or roads, already constructed, or in the course of construction at the time of the levy of the tax, unless the amount that would be ratably levied upon such lands exceed the amount of such assessment, and in such case such excess only shall be levied and collected; and for the purpose of raising the money necessary to meet the expenses of such improvement, the county commissioners may, if in their opinion the same be advisable, issue the bonds of the county, payable at such times as they may deem advisable, with interest not exceeding the legal rate per annum, payable semi-annually, and which bonds shall not be sold for less than their par value.

SEC. 4770. The commissioners shall cause to be kept by the county auditor full record of all the proceedings in the location, establishment and construction of the road, together with accurate accounts of receipts and expenditures of money under the provisions of this chapter; and no money shall be drawn from the treasury except to pay liabilities already accrued, and then only in pursuance of orders caused by the

commissioners whilst in session as a board, to be entered upon the record of their proceedings, and by orders drawn by the county auditor, upon the county treasury, in favor of the persons to whom such money is due.

SEC. 4771. The work of the construction of such roads shall be let publicly by the county commissioners to the lowest responsible bidder, after due notice given of such letting by publication in one or more newspapers published or of general circulation in the county, or by handbills, or both; for that purpose the commissioners shall cause the same to be divided into convenient sections, and each section numbered from the county seat, or other point named as the place of beginning, toward the termination, and shall let the same by sections, with proper specifications of the various kinds of labor required on each section; and bidders shall be required to separately state their bids for each class of work, in such manner as the commissioners shall provide, and each contractor shall be required to give bond, with sufficient sureties, for the performance of his contract, payable to the county commissioners, for the use and benefit of the county, and with the necessary specifications and stipulations on the part of the contractor inserted therein.

SEC. 4772. In all cases the construction of such roads shall commence at the point of beginning, and no payment for work or material shall be made except upon estimates made by the surveyor or engineer employed by the commissioners, and by him duly certified, of work actually done or materials actually furnished, or both, and after reserving such per cent. as may be fixed by the parties to the contract, to guarantee performance of the same.

SEC. 4773. The viewers, surveyor or engineer, and their assistants, shall be entitled to receive the same compensation for their services required under the provisions of this chapter, as is now allowed by law in the construction of State or county roads.

ONE MILE ASSESSMENT—TURNPIKES OF OHIO.

(Chapter 7, page 1171, Vol. II, Revised Statutes of Ohio.)

SEC. 4774. Free turnpike roads shall be authorized, and commissioners appointed to lay out and establish the same, in the following manner: A majority of all the landholders residing in the county, who own lands lying within the bounds of any free turnpike, as provided in this chapter, shall present a petition to the board of county commissioners at any regular session, asking the appointment of commissioners to lay out and establish a free turnpike road between any points within such county, and stating therein that they desire the county commissioners to levy an extra tax, the amount of which shall not exceed ten mills on the dollar valuation in any year, on the lands and taxable property within the bounds of the road, and also the number of years they desire the levy to continue, not exceeding eight years; and they shall satisfy the commissioners that public notice has been given by advertisement in some newspaper of general circulation in such county, of such intended application for at least four consecutive weeks preceding such regular meeting.

SEC. 4775. Thereupon the commissioners shall appoint three judicious freeholders of the county to be commissioners of such free turnpike road, who, by the name fixed by the county commissioners, shall be a body corporate, for the purpose of laying out and establishing a free turnpike road between the points within such county named in the

petition: the petition, and the appointment of such commissioners, shall be entered upon the minutes of the proceedings of the board of county commissioners, and a certified copy of such entry furnished to the road commissioners, by the clerk of the board, upon demand therefor; and the board of county commissioners may remove, for cause, any or all of the commissioners of any free turnpike road, when petitioned so to do by a majority of the land owners residing within the county, who own lands within the bounds of such road; but, on the removal of any such commissioner, the vacancy shall be at the same time filled by the appointment of some other freeholder of the county and the commissioners shall appoint such person as may have been recommended by petition of a majority of the landowners, if any such recommendation be so made.

SEC. 4776. The commissioners, so appointed by the board of county commissioners, and who qualify as in hereafter provided, shall, within a reasonable time, proceed to lay out and establish such free turnpike road within the points named in the petition, and as soon thereafter as the same can be done return to the board of county commissioners a map and profile of such road, including upon the map, as near as can be done, the names of the landholders whose property may be liable to be taxed for its construction, as hereinafter provided, together with a statement of the probable cost of building and completing the road.

SEC. 4777. The board of county commissioners shall immediately thereafter transmit to the auditor of the county said map, profile and statement as returned to them by the road commissioners, and shall at the same time direct the auditor to levy upon the grand duplicate of the county, for the purpose of constructing, improving and repairing such road, the amount of the tax, and for the number of years petitioned for, and the auditor shall enter the same upon the duplicate for collection, on all the lands and taxable property within the bounds of the road, as laid out and established, in the same manner and subject to the same penalties and forfeitures as other taxes are entered thereon for purposes of collection; but no such tax shall be levied for an amount or for a term of years greater than that set forth in the petition, unless at the expiration of said time the petition be renewed, and in that event such tax shall be levied for any number of years that may be set forth in the petition, as, when added to the first levy, will not in the aggregate exceed ten years.

SEC. 4778. If at any time after the first levy is made, the commissioners of any free turnpike road are satisfied that the road can be built with a less sum than is provided in preceding section, the auditor shall, on the order of the commissioners of the road, reduce the extra tax, or abate it entirely; but when any of such freeholders previously made, or have been previously taxed to make, any free turnpike already completed or in progress of completion, they shall only be taxed *pro rata* for the making of the remainder of the turnpike, or the continuance thereof; and when any of such freeholders, or those from whom they derive their title, have, before the levy of said tax, improved at their own expense, by macadamizing or graveling, any portion of the line of the proposed free turnpike road adjacent to their lands, they shall, if by such improvement such portion has been made and maintained so as to be at that time wholly fit for a free turnpike road, or if by such improvement such portion is in part only suitable for free turnpike road, be entirely exempt, as to lands and other property on either side of and opposite to such improved portion, from the payment of said

extra tax, or have credit upon said extra tax in the proportion that such labor performed bears to the average amount of labor required to construct such part of the line of such proposed free turnpike road.

SEC. 4779. Such *pro rata* tax exemption or credit shall be determined by the auditor and the commissioners of the proposed free turnpike road, at any time before payment of such extra tax, upon the application of any person interested; but such determination may be reviewed and corrected by the court of common pleas, upon the petition of any person claiming such *pro rata* reduction, exemption or credit, and upon such evidence as may be produced upon the hearing; and the county treasurer shall collect the extra tax in the same manner as state and county taxes are collected; provided, that the words "bounds of the road," and "line of the road," wherever used in this chapter, shall be held to include so much land on either side of such road as may be charged with such extra tax.

SEC. 4780. The road commissioners shall severally execute a bond payable to the State, for the use of the county in which the road is located, with good and sufficient sureties, to be approved by the board of commissioners of the county, and in such sum as the board think proper, conditioned for the faithful performance of their duties as such road commissioners, and shall, moreover, each take an oath faithfully and honestly to discharge their duties before they shall be authorized to do or perform any matter or thing under this chapter; and the commissioners after qualifying shall immediately meet and organize their board by choosing one of their number as president thereof, and within a reasonable time thereafter proceed to view, locate and establish such free turnpike road in the manner provided in this chapter.

SEC. 4781. The road commissioners may appoint superintendents and such other agents as they may deem necessary to carry into effect the provisions of this chapter; a majority shall be a quorum, and have power to transact any business and exercise any power devolving upon or intrusted to them by this chapter, and they shall keep a record of their proceedings, which shall at all times be open for inspection, by any person interested, or desiring to inspect the same.

SEC. 4782. The commissioners may receive subscriptions and donations, in money, or real or personal property, which shall be applied to the construction of the road; they may make contracts for constructing the road in a solid and durable manner, and keeping the same in repair; they may open and furnish the road in the first instance along such portions of the line thereof as are available for travel or transportation; they may purchase and procure all necessary implements and fixtures to preserve the road, and contract for and purchase such stone, gravel and other materials as may be necessary for its construction and repair; and if the commissioners and owners of such material cannot agree on a price deemed fair and reasonable, the commissioners may apply to the judge of the probate court of the county to appoint appraisers to assess the value of such material.

SEC. 4783. On the filing of such application the probate judge shall appoint disinterested freeholders, who, after being duly sworn to impartially assess the value of the material, or any part thereof, shall enter upon the premises of the owner of such materials, and assess the value thereof, and the damages that will accrue to the owner by the removal thereof through his premises, and within ten days after appointment return their award to the court; thereupon the probate judge shall require the commissioners to pay for or give security for the

payment of all materials to be taken, and damages done to the owner of the premises, and in ten days after the return of the award, on application of the commissioners, furnish them a copy of the same; and they may thereupon enter upon the lands, either enclosed or uninclosed, and remove such stone, gravel or other material, unless an appeal has been taken as provided in the next section.

SEC. 4784. An appeal from the decision of the appraisers may be taken by either party to the court of common pleas, within twenty days after the rendering of the award, upon the appellant entering into and undertaking to the adverse party, in a sum not less than fifty dollars, and in all cases not less than double the amount of such award.

SEC. 4785. The commissioners may receive donations of land to aid in the construction of the road, and sell and convey the same in fee simple, and they may take releases of the right of way.

SEC. 4786. Extra taxes, when levied as hereinbefore provided, shall be on real and personal property within one mile on each side of the free turnpike road, except when any free turnpike road in process of construction crosses a free turnpike road, either completed or in process of construction, under and by virtue of any of the road improvement or free turnpike laws, in which case such lands and personal property as lie within one mile on either side of where such free turnpike roads cross each other shall be assessed and taxed, in proportion to the benefit that may be derived by the owners of the land and personal property from the construction and use of such free turnpike roads; except, further, that when any road improvement, or free turnpike road, built and completed under any of the turnpike laws, begins or terminates in the proposed free turnpike, or where any of such roads, or any toll-road or unimproved State or county road, being unconnected with the same, runs upon either side of such proposed road, within less than two miles, then the taxes shall only be levied upon such lands and personal property as lie within one-half the distance of such roads.

SEC. 4787. No division of territory, or division of taxation of lands or personal property, shall be made with any other road improvement, free turnpike road or State or county road, except as herein provided for, nor with any township road; but if the road commissioners report to the county commissioners that the extra taxes levied within the bounds of the road are insufficient to make a good and substantial road, the county commissioners, if in their opinion the public interest requires it, may order the road commissioners to extend the bounds of the free turnpike road to one mile on either side of the same when a majority of the resident land owners owning land within the bounds of the territory proposed to be extended sign a petition therefor; but if a turnpike road runs upon either side of such free turnpike road, within less than two miles, the taxes shall be levied upon such lands and personal property as lie within one-half the distance of such roads.

SEC. 4788. So much of the taxes annually levied for road purposes by the trustees of townships, which may be collected within the bounds of any free turnpike road, including the two day's labor authorized by law, shall be applied in the construction and repairs of the road, under the direction of the road commissioners, or their agents, until the road is completed.

SEC. 4789. If, before the completion of the road, the trustees fail to direct the supervisors of any road district, the whole or any part of which is within the bounds of any free turnpike road, to apportion the labor provided for in the preceding section, annually, before the first

day of May, and to give notice thereof in writing to the commissioners aforesaid, then all persons liable to do two days' labor, annually, on the public highways, residing within the bounds of any free turnpike road, shall do the same under the direction of the commissioners or agents of such road.

SEC. 4790. All such persons shall perform such labor, after being notified three days previous to the time of doing the same, between the first day of April and the first day of July; but they may pay to the superintendent the sum of three dollars, in lieu of said two days' work, if paid when notified to do the work; and in case of refusal or neglect to do the same, the persons so offending shall pay a fine of one dollar, and shall further be liable, in case of non-attendance, to the amount allowed for two days' work, to be collected by the road commissioners, in the same manner that supervisors are authorized to collect in similar cases.

SEC. 4791. So much of the taxes mentioned in the preceding section which is not discharged in labor, and which is paid into the county treasury, shall be paid by the treasurer, upon the warrant of the county auditor, to road commissioners, to be expended by them in constructing such free turnpike road; when two or more free turnpike roads cross each other the county commissioners of any county through or in which any such roads, or any part thereof, may be located, may make such equitable division or apportionment of the taxes, other than extra taxes among such roads as they deem proper, the same to be discharged in labor, under the direction of the road commissioners, or paid to them in money, as herein before provided.

SEC. 4792. The road commissioners shall, annually, on the first Monday in December, make a full settlement with the county commissioners of the several counties in or through which their respective roads are located, and shall file with them a statement of all their receipts and expenditures within the county, and deposit a copy thereof in the auditors office of the county.

SEC. 4793. Should such commissioners fail to make settlement as provided by the preceding section, the county commissioners shall, at the next term of the court of common pleas of the county, cause an action to be instituted against them, in the corporate name of the road, to enforce such settlement.

SEC. 4794. Such action shall be conducted by the prosecuting attorney of the county, and such delinquent commissioners shall be held *prima facie* liable for the full amount of taxes and money which were applicable to the construction of the road as the same appears upon the tax duplicate of the county; and in all cases judgment shall be rendered against them for all the costs of the suit.

SEC. 4795. The road commissioners and their successors shall be a body corporate, under such name as the commissioners of the county may designate, for the purpose of carrying into effect the provisions of this chapter; they shall prosecute for all obstruction to the road, or for injuries done to the same or to bridges thereon; the amount recovered in each case shall be the amount of damages actually found by the court or a jury, and the interest thereon; and in all cases the commissioners shall have a right to sue, either before a justice of the peace, or in the court of common pleas of the county, as in other cases, and the amount so collected in each case shall be used for the benefit of the road, and be paid over to the commissioners.

SEC. 4796. When the road commissioners deem they have their road,

or any one consecutive mile thereof, completed in a good, substantial manner, by the bridges and culverts thereon having been built, or the road graded or macadamized, and the same paid for, they may make application to the board of county commissioners to receive the same; the county commissioners shall within a reasonable time after the filing of such application, proceed, upon actual view, to examine the same, and if, upon such examination, they be of the opinion that such road or part thereof, is in a suitable condition to receive as completed, they may receive the same, and such road or part thereof may be kept in repair as provided in chapter ten; and when the free turnpike road has been completed and received by the county commissioners, they shall enter such findings upon their journal, and the county auditor shall certify such findings to the trustees of the several townships through which any part or all of the road runs, giving the name and description of the same, and from that time the road commissioners shall cease to be a body corporate.

SEC. 4797. The commissioners, superintendents, and agents of the road shall be allowed one dollar and fifty cents per day for every day actually employed on the business of the road; and when any vacancy occurs in the board of commissioners by death, resignation or otherwise, the commissioners of the county shall, when notified thereof, fill the same.

SEC. 4798. The expenses of surveying and locating the road shall be paid out of the county treasury, and the other expenses incident to the construction of the road shall be paid out of the funds appropriated by this chapter to the construction of the same; and the sum paid the surveyor and his assistants shall not exceed the customary wages per day for every day they may be actually employed in locating and surveying the road.

SEC. 4799. All petitions to the county commissioners to appoint commissioners to lay out and establish free turnpike roads, and to levy an extra tax for the construction thereof, and all remonstrances against either, shall only be signed by freehold taxpayers, resident within the county in which the road is proposed or situated, owning lands within the bounds of the road, as described in section forty-seven hundred and eighty-six; minors residing in the county, and owning lands in such bounds, shall not be counted for or against the road or extra tax, unless represented by their legal guardian; and all owners, either adults or minors, of any undivided estate, shall only be entitled to one vote for or against the road or tax.

SEC. 4800. The county commissioners shall, when they believe the public interest requires it, build any or all of the bridges and culverts upon the roads provided for in this chapter, in such manner as they deem best.

SEC. 4801. When two consecutive miles or more of any free turnpike road is made in good order for travel or transportation, and the taxes applicable thereto and the two days' labor will not keep the same in repair and three-fourths of the resident freeholders on the road, as described in section forty-seven hundred and eighty-six, after giving notice as required in section forty-seven hundred and seventy-four, petition the county commissioners therefor, it shall be their duty to authorize the commissioners of the road to place a gate or gates on their road, and charge such rate of toll, when added to the common tax of the grand levy and the two days' work, as will keep the road in good repair; but no greater rate of toll shall be charged than is allowed by law to

turnpike roads; and the road commissioners shall continue to manage such free turnpike road, and have the benefit of all laws regulating turnpike roads in the collection of tolls, and other matters pertaining to the maintenance and preservation of the road.

SEC. 4802. The board of county commissioners of any county may change the location of any part of any free turnpike road, in the same manner and on the same conditions that they are by law authorized to change the location of any part of a county road; and the same laws applicable to the alteration of county roads shall be applicable in such cases to free turnpike roads.

SEC. 4803. All claims for damages arising out of the location of any free turnpike road shall be settled in the manner prescribed in chapters two and four in like cases.

SEC. 4804. When the resident land-owners along any road in this State reside in different counties, and wish to improve the same under the provisions of this chapter, they shall petition the boards of county commissioners of their respective counties, as required by section forty-seven hundred and seventy-four; and in such case, the commissioners of the different counties may join in carrying out the provisions of this chapter, by severally appointing commissioners to lay out and establish a free turnpike road, in all respects as if said petitioners resided wholly in one county.

SEC. 4805. The commissioners so appointed shall qualify, as in this chapter provided, and shall immediately proceed to lay out and establish such free turnpike road and severally make return to the board of county commissioners of their respective counties, of a map, profile and estimate of the cost of construction of the free turnpike road, as provided in section forty-seven hundred and seventy-six; and the board of county commissioners of each county shall immediately transmit such map, profile and estimate, to the auditor thereof, and shall at the same time levy upon the grand duplicate of the county, for the period and under the limitations mentioned in this chapter, any amount of money that may be required not exceeding ten mills upon the dollar valuation in any year, on all the lands and taxable property in the county within the bounds of such free turnpike road, as provided in section forty-seven hundred and seventy-four; and shall certify such levy to the county auditor in the manner provided in section forty-seven hundred and seventy-seven; and the respective county auditors shall be governed in all respects by the provisions of said sections in entering said levies upon the duplicate for collection, and in all other matters pertaining thereto, in conformity to this chapter.

SEC. 4806. Such boards of road commissioners, in all of their subsequent joint acts pertaining to the construction and repair of [any] such free turnpike road, shall be governed in all respects by the provisions of this chapter, and to the same extent as if the road were laid out and established wholly in one county; but when resident land-owners desire to make a free turnpike road on a county line between two or more counties, and there are no resident land-holders in one or more of such counties, within the bounds of the proposed road, a copy of the petition presented to the commissioners of the county in which there are resident land-owners within the bounds of the proposed road, if the same be allowed, and the road be established by the commissioners of such county, shall be presented to the commissioners of the county in which there are no resident land-owners within the bounds

of the road, and they shall act on the same in all respects as if the petitioners were residents of such county.

SEC. 4807. In laying out and establishing free turnpike roads under and by virtue of the provisions of this chapter, it shall be lawful to lay out and establish the same, in whole or part, upon the line of any State, county or township road, or upon any two or more of such roads.

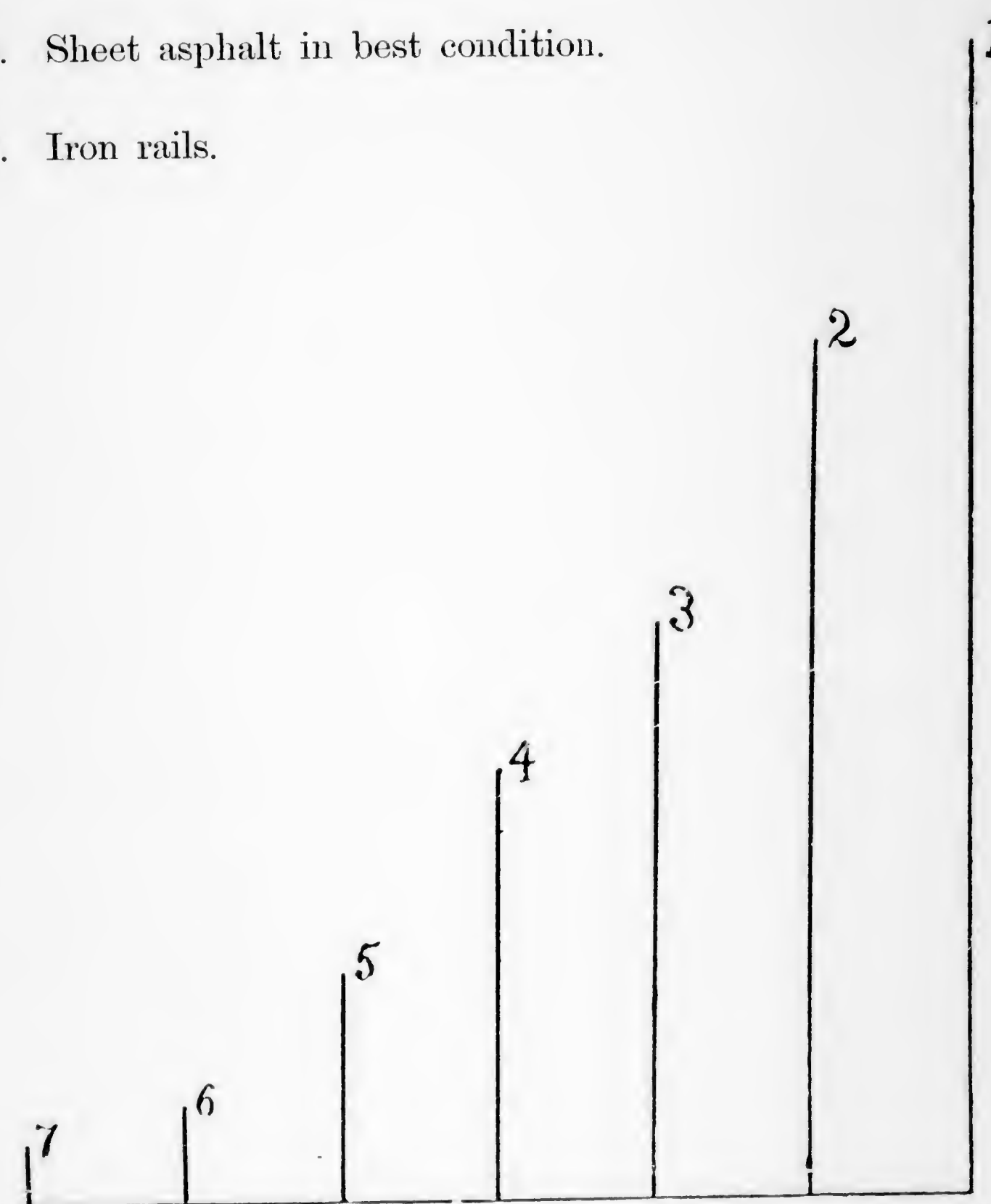
SEC. 4808. The commissioners of any free turnpike road, whenever they deem it necessary for the purpose of constructing a free turnpike road, are authorized to issue bonds, payable at the county treasury in installments, at intervals not exceeding the number of years set forth in the petition, as provided in section forty-seven hundred and seventy-four, bearing interest not exceeding six percentum, payable semi-annually; which bonds shall not be sold for less than par, and shall be registered by the county auditor, previous to their issue, in a book by him kept for that purpose; such registry shall show the number of each bond issued, the amount for which issued the rate of interest which it bears, and when the same is payable; and the extra taxes levied under the provisions of this chapter shall be divided in such manner as to meet the payment of the interest and principal of the bonds, and when collected the money arising therefrom shall be paid to the road commissioners, by the treasurer of the county, upon the warrants of the county auditors; and the road commissioners shall apply the money first to the payment of their bonds and interest, and next to the construction and improvement of such free turnpike road, and in discharging any indebtedness incurred on account thereof.

SEC. 4809. It shall be the duty of the county commissioners to consolidate two or more free turnpike roads that are so situate that by one ending in another, or by one crossing another, or otherwise, they form continuous line or lines of travel, if they are satisfied the consolidation will be to the benefit of the roads and the public, and enter upon their minutes an order consolidating the roads, and appointing commissioners for the consolidated road, who shall have all the powers, and perform all the duties, in relation thereto, prescribed by this chapter; and from and after the organization and qualification of such commissioners, the powers of the commissioners of the several roads so consolidated shall cease, and the roads shall thence forward constitute one free turnpike road, to which all the laws relating to free turnpike roads in force from time to time shall apply the same as if such [road] had been originally so established.

SEC. 4810. Any levy of extra taxes for either of such roads existing at the time of such consolidation shall be worked out, or collected and applied according to law for the purposes of that part of such consolidated road for which they were made; and all money in the treasury or elsewhere, arising from any extra tax for either of such roads, shall be applied in like manner; but the commissioners of the consolidated road shall have the same powers as to reducing or abating such levies as are or may be provided by law for commissioners of free turnpike roads.

SEC. 4811. Upon the organization and qualification of the commissioners of such consolidated road, the commissioners of the several roads forming the same shall settle their accounts with the county commissioners, and deliver up all money or other property, and also all records, books and papers belonging or pertaining to such roads to the commissioners of such consolidated road.

1. Earth road in average condition.
2. Gravel road in good condition.
3. Earth road in good condition.
4. McAdam road in fair condition.
5. McAdam road in best condition.
6. Sheet asphalt in best condition.
7. Iron rails.



COMPARATIVE DRAFT ON DIFFERENT ROADS.

SEC. 4812. The provisions of this chapter shall extend and be applicable to all free turnpike roads heretofore built, now in process of construction, or hereafter to be constructed; and for the purpose of completing the same, and liquidating any indebtedness incurred on account of such road, the county commissioners may continue the tax originally levied for constructing the same, for a period not exceeding, in the aggregate, five years.

SEC. 4813. Certificates from the road commissioners to persons owing any free turnpike tax, for labor performed in discharge of the same, shall be receivable by the treasurer of the county, at the December collection of taxes, in payment of such tax; and such certificates shall specify the amount of tax so paid, and shall in no case exceed the amount of extra tax charged against such person upon the duplicate of the county.

SEC. 4814. When the right of any free turnpike road company to levy special taxes to pay the orders by it has ceased, leaving outstanding orders unpaid, and their payment unprovided for, the commissioners of such road company shall immediately make out and deliver to the auditor of the county in which such road or any part thereof is situate, a complete and perfect list of all such outstanding orders for the payment of which they have no funds or means of payment, with a description of each order, as to date, amount, rate of interest, if any, and when payable, which shall be verified by such commissioners, and the county auditor shall lay the same before the county commissioners at their next regular session thereafter.

SEC. 4815. At any regular session of the county commissioners at which such list is laid before them, they shall immediately proceed to ascertain the aggregate amount of such orders, including interest, in case they draw interest, and adding thereto an amount sufficient to pay the expense of assessment and collection, and to cause the same to be assessed upon the same lands and lots as were subject to taxation for the construction of the road, or to pay for the same at the time when the right to tax such lands and lots ceased, according to their true value in money, as shown by their valuation contained in the county duplicate.

SEC. 4816. When, by the laws in force immediately preceding the time when the right to levy taxes for the benefit of any such road ceased, different rates of taxation were authorized upon the lands adjacent to or lying near any such road, according to their proximity to such road, the amount authorized to be levied by the preceding section shall be so assessed upon those lands as to preserve the same relative proportions between the taxes on the several tracts as formerly; but the county commissioners may in their discretion divide the aggregate of such indebtedness into instalments, not exceeding five in number, and order that one of those instalments be assessed and collected annually, and the amount so assessed shall be collected in the same manner as state and county taxes.

SEC. 4817. Immediately after the settlement of the county treasurer with the county auditor in August of any year, next after that in which any assessment has been made, as provided in the two preceding sections, the county auditor shall proceed to ascertain the net amount of money collected on account of the indebtedness of such free turnpike road company; and if the amount so collected is sufficient to pay the whole of such indebtedness, he shall proceed to pay all orders of such

road company on presentation, by his warrants drawn on the county treasurer, payable out of the proper fund, and shall cancel such orders, and keep them on file in his office; but if the net amount so collected shall be sufficient to pay the orders in full, or the amount of indebtedness has been ordered to be collected *pro rata* among the holders of the orders, taking up and cancelling the original orders, and issuing new orders for the balances unpaid.

SEC. 4818. When a free turnpike road is finished according to law, with an outstanding debt unprovided for, and the right to levy special taxes for the benefit of such road has not ceased, such special taxes, when collected, shall be applied exclusively to the payment of such debt till the same is paid in full.

SEC. 4819. The county commissioners, whenever in their opinion the public interest will be subserved thereby, may surrender to any turnpike company any free turnpike or other road in the county, and direct that the taxes levied and collected for such road, and not otherwise appropriated by law, shall be paid over to such turnpike company to expend in constructing or repairing the road, to construct or repair which the same were levied.

SEC. 4820. Any turnpike company receiving such surrender shall issue to the persons upon whose property taxes have been levied to construct or repair such road, certificates of stock for the amount of taxes by them respectively paid, upon which they shall be entitled to dividends, *pro rata*, as other stockholders may be, upon their stock.

SECTION 4821. When three consecutive miles of such road have been constructed and finished, according to law, the directors of such company may establish a toll-gate thereon, and for every additional five miles finished as aforesaid an additional gate, and may demand and receive tolls thereat, at rates not exceeding the rates allowed by law to other companies.

SEC. 4822. In elections for directors of such company, each stockholder shall be allowed one vote for each share of stock by him held, and one vote for each fraction greater than half a share.

SEC. 4823. Councils of villages are authorized to levy a tax to construct free turnpike roads, or a part thereof, in counties wherein such villages are situate, and terminating or running through such villages, and for this purpose such councils are authorized to issue the bonds of the villages, payable with legal interest at such times as the councils may deem advisable, and such bonds shall not be sold for less than their par value.

SEC. 4824. For the purpose of paying such bonds, and the interest thereon, as the same become due, the councils are authorized to levy a tax upon the taxable property of such villages sufficient for the purpose, not exceeding five mills on the dollar in any year; but such tax shall in no case be levied, nor shall such bonds be issued, until at some regular election, held in such villages, the majority of the qualified electors thereof approve the tax; and in case the amount to be appropriated for any one road does not exceed the sum of five hundred dollars, the councils may appropriate and apply the same in money for said road improvement, out of any money on hand, or funds not otherwise appropriated, without issuing bonds or levying a tax, such appropriation to be made by an ordinance passed for the purpose, specifying particularly the amount, and for what road appropriated.

SEC. 4825. When a free turnpike road in progress of construction terminates within one mile, by way of a public road, of any such

village, the council of such village shall have the same power to levy a tax and issue bonds to aid in the construction of such free turnpike road that it would have if the road terminated in the village; and if the county commissioners having in charge the construction of such road accept such bonds, such free turnpike road shall be deemed to be extended, by way of the public road before mentioned, to the corporate limits of the village; and the commissioners shall make and publish an order to that effect, and thereupon the commissioners shall improve such extension of such free turnpike road, in the same manner as the other parts of the same.

SEC. 4826. When the commissioners of a free turnpike fail, either for want of time or sufficient means, to complete such roads, the county commissioners of the county or counties through which it (is) located may grant such extension of time for the completion of the same as to them may seem reasonable and proper; and in all cases of indebtedness for the erection of bridges upon the line of such free turnpike roads, the county commissioners may discharge such indebtedness from the treasury of the county in which such bridge or bridges may be located.

SEC. 4827. When the commissioners of a free turnpike road have completed the same, they shall immediately thereafter make a final report to the county commissioners of the total expenditures on the road, and deposit their books and papers with the county auditor, after which time the free turnpike road shall be kept open and in repair as provided in chapter ten.

SEC. 4828. When any part of a free turnpike road becomes useless, or remains unopened for the term of five years, after the same has been established, the commissioners of the county, may, on application of twelve freeholders of the county, appoint three disinterested freeholders to view the same, and report whether such road is useless, or whether it would be of public advantage to vacate it; and if such freeholders report in favor of such vacation, the county commissioners may order the road to be vacated, and the same proceedings shall be had on such application as are provided on applications to vacate county roads.

TWO MILE ASSESSMENT TURNPIKES OF OHIO.

(Chapter 8, page 1182, Vol. II, Revised Statutes of Ohio.)

SEC. 4829. The county commissioners of any county shall have power as herein after provided, to lay out and construct any new county road, or to improve any State, county or township road, or any part thereof, or any free turnpike road, or any part thereof not completed, by straightening or altering the same, and by grading, paving, graveling, planking or macadamizing the same, and by draining the same in any direction required to make the most convenient and sufficient outlet; and for such purpose they may, upon further petition, when by them deemed expedient, vacate any State, county or township road, or any part thereof, or any free turnpike road, or any part thereof not completed, and may improve several roads or parts of roads, or free turnpike roads, or parts thereof not completed, when the same may be united in one continuous road improvement.

SEC. 4830. They may improve by grading, gravelling or macadamizing any unfinished turnpike road other than such as charge and receive tolls, and, when the grading has been already done, and the bridges and culverts already built, one-half of the cost of such improve-

ments shall be assessed upon the landholders along and adjacent to the line of the road, as provided in this chapter, and one-half on the grand duplicate of the county.

SEC. 4831. Upon the presentation of a petition stating the kind of improvement prayed for, and the points between which the same is asked, signed by five or more of the landholders whose lands will be assessed for the expense of the same, and the filing of a bond, signed by one or more responsible freeholders, to whom the petitioners shall be responsible *pro rata*, conditioned for the payment of the expenses of the preliminary survey and report, if the improvement be not finally ordered, the commissioners shall appoint three disinterested freeholders of the county as viewers, and a competent surveyor or engineer, to proceed, upon a day to be named by the commissioners, to examine, view, lay out or straighten such road as in their opinion public convenience and utility require.

SEC. 4832. The county auditor shall notify the viewers and surveyor of the time and place of their meeting to make the view, and shall also give notice by publication, in newspaper printed in the county, for three consecutive weeks prior to the meeting, which notice shall state the time and place of meeting, the kind of improvement asked for, the place of beginning, intermediate points, if any, and the place of termination.

SEC. 4833. The viewers, and surveyor or engineer, shall meet at the time and place specified by the commissioners, and after taking an oath faithfully and impartially to discharge the duties of their appointments shall take to their assistance two suitable persons as chain-carriers, and one marker, and proceed to view, examine, lay out or straighten such road as in their opinion public utility and convenience require, and assess and determine the damages sustained by any person through whose premises the road is proposed to be laid out, straightened or improved; but the viewers shall not be required to assess damages to any person except minors, idiots or lunatics, in consequence of the appropriation of any private property for the making of the improvement, unless the owner thereof, or his agent, file a written application with the viewers, giving a description of the premises on which damages are claimed by them.

SEC. 4834. All applications for damages shall be barred, unless they be presented as above required, and any person feeling aggrieved by the assessment made may demand of the commissioners to have the same assessed by a jury; in which case the claimant may appeal to the probate court of the county, and the same proceedings shall there be had, and like orders and judgments rendered, as are provided in chapter four; but the guardian of any minor, idiot or insane person may act for his ward, and all his acts shall be binding upon the ward.

SEC. 4835. The viewers, and surveyor or engineer, shall make a report to the commissioners at their next regular session, showing the public necessity for the contemplated improvements, the damages claimed, and by whom, the amount assessed to each claimant, an estimate of the expense of the improvement, and the lots and lands which will be benefitted thereby, and ought to be assessed for the expense of the same; but no lands shall be so assessed which do not lie within two miles of the proposed improvement, and the distance of two miles may be computed in any direction from either side, end or terminus of the road; and lands that have once been assessed for the expense of any improvement made under the provisions of this chapter, shall not be

re-assessed under subsequent proceedings for an extension of the same, unless the prior assessment be not deemed proportioned to the whole benefit resulting to such lands.

SEC. 4836. When a report is filed, the commissioners shall, if in their opinion public utility requires it, enter on their records an order that the improvement be made, which order shall state the kind of improvement, the width and extent of the same, and the lands which shall be assessed for the expense thereof; but such order shall not be made until a majority of the resident landholders of the county whose lands are reported as benefitted, and ought to be assessed, subscribe the petition mentioned in section forty-eight hundred and thirty-one in determining such majority, minor heirs shall not be counted for or against the improvement, unless represented by legal guardian, and the action of such guardians shall be binding upon such minor heirs; and all heirs or owners, either adults or minors, to any undivided estate, shall only be entitled to one vote for or against such improvement.

SEC. 4837. If it appears that any person who signed the petition asking for such improvement afterward signed a remonstrance against the same, so that by counting such person remonstrator instead of petitioner the object and prayer of such petition will be defeated, the person who is both petitioner and remonstrator shall be held liable, and shall pay all costs growing out of the presentation of the petition, and the proceedings had thereon; and if the costs are not paid within thirty days after the dismissal of further proceedings in the case, the auditor shall apportion the costs among such persons, in the proportion of the appraised value of their several lands for taxation that are within two miles of the route on which the improvement was prayed for, and shall place the same on the grand duplicate for collection, to become due and payable at the next December collection of taxes thereafter; and the same penalty shall attach, and the same proceedings shall be had in the collection, as in delinquent state and county taxes.

SEC. 4838. If at any time after making such final order the commissioners find that there has been an omission of lots and lands within the territory sought to be assessed, or that there has been manifest injustice in the apportionment of taxes, or that public necessity requires any alteration in the manner of the improvement as ordered, they make such addition and re-apportionment as they deem just and proper, and such change in the improvement as will conform the same to the public requirement.

SEC. 4839. All proceedings relating to the construction of such improvements may be discontinued at any time before a contract is entered into for the improvement, by the filing of a notice with the county auditor, signed by a majority of the petitioners for the improvement, stating that they will not further prosecute the same, and the payment of all costs that have accrued up to the time such notice is filed; and thereupon the auditor shall immediately notify the engineer, and cause all proceedings relating thereto to be discontinued, and the county commissioners at their next regular or called session, shall place upon their records an order abandoning such proposed improvement, and vacate and set aside the order for the improvement.

SEC. 4840. At any time after the contract for the improvement is made, the commissioners may, with the consent of the contractor for the improvement, or the part or parts thereof to be affected and also the consent of the majority of the petitioners for the improvement whose lands lie within two miles of the part thereof to be affected, vacate and

set aside the order for the improvement, or any part thereof, or abandon any part of such proposed improvement, if they deem it proper and advisable to do so; and in such case, if the order as to a part of such improvement be abandoned, such action shall not in any way impair or affect any order, contract or proceeding relating to the remainder of the improvements; but no assessment shall be made for the remainder of any such improvement upon any lands not laying within two miles of such remainder.

SEC. 4841. After making such order for an improvement or for any change in the same, the commissioners shall appoint a competent engineer to superintend the performance and completion of the work, who shall, with the approval of the county commissioners, make a contract for the performance of the work, and the contractor may at once enter upon the performance of the work, under the superintendence of the engineer; but the improvements shall be let in sections of not less than one-half mile, by public outcry or sealed bids, and to the lowest and best bidder, who shall give such reasonable security for the proper performance of his contract within the time and in the manner prescribed, as the county commissioners may deem expedient. The county commissioners may, for cause, remove the engineer, at any time, and appoint another in his place.

SEC. 4842. The commissioners, when any such improvement is ordered, shall immediately appoint three disinterested freeholders of the county who shall upon actual view of the premises, apportion the estimated expense thereof upon the real property embraced in the order, according to the benefits to be derived therefrom, and report the same to the county auditor; and in making such apportionment they shall take into consideration previous assessments made upon such real property for the improvement of the road, and any benefit which will accrue to any land by reason of drainage resulting from the making of the improvement; and if any of the lands to be assessed are subject to a life estate assessment made thereon, shall be apportioned between the owner of the life estate and the owner of the fee in proportion to the relative value of their respective estates, such proportion to be ascertained upon the principles applicable to life annuities.

SEC. 4843. When the report of the committee is returned, the county auditor shall give notice thereof by publication in some newspaper published and of general circulation in the county, for at least three consecutive weeks, of the time when the commissioners will meet at the county auditor's office to hear the same; and on the day named in the notice the commissioners shall meet, and if no exceptions have been filed to the report, shall confirm the same; but if exceptions in writing have been filed by any of the owners of the lands affected thereby, they shall first proceed to hear such exceptions, and for that purpose shall hear any testimony offered by any party interested, and either of the commissioners may administer oaths to witnesses; and after such hearing they may either confirm the report, change it, or refer to a new committee of three disinterested freeholders.

SEC. 4844. If the report be referred, the new committee shall, upon actual view of the premises, report a new apportionment, or recommend the confirmation of the former report; upon the return of such report to the county auditor, the same proceedings shall be had as upon the return of the first report, except that there shall not be a reference to another committee: and the final action of the commissioners shall be entered upon their records, together with the report as con-

firmed, showing how the estimated expense has been apportioned upon the lands ordered to be assessed.

SEC. 4845. After the work is completed, the county auditor, before placing the assessment upon the duplicate, shall add to or deduct from the estimate, *pro rata*, the amount that the actual expense may be found to be more or less than the estimate; all assessments on lands, under the provision of this chapter, shall be placed upon a special duplicate, to be provided by the county auditor at the expense of the county; and the costs and expenses of the preliminary survey, proceedings and report of the improvement, shall be paid out of the county treasury.

SEC. 4846. For the purpose of raising the money necessary, to meet the expense of the improvement, the commissioners of the county may issue bonds of the county, payable in instalments, or at intervals not exceeding in all the period of five years, bearing interest at a rate not to exceed seven per cent. per annum, payable semi-annually, which bonds shall not be sold for less than their par value; the assessment shall be divided in such manner as to meet the payment of principal and interest of the bonds, to be placed upon the duplicate for taxation against the lands assessed, and collected in the same manner as other taxes; and when collected, the money arising therefrom shall be applied to no other purpose than the payment of the bonds and interest; but the county commissioners shall build all bridges and culverts on the improvement, and pay for the same out of the bridge fund of the county; and no bonds shall be delivered, or money paid to any contractor, except on the estimate of work done, as the same progresses or is completed.

SEC. 4847. If it be ascertained by the county auditor that the assessments on land upon the duplicate are not sufficient to pay for the construction of any such road, he shall add to the assessments, *pro rata*, the amount that the actual expense is found to be more than the assessments on the duplicate, and the additional assessments shall be placed upon the same duplicate with previous assessments for the construction of the same road, and shall be collected in like manner.

SEC. 4848. Any balance of assessments made for the construction of any such road, remaining in any county treasury after the payment of all expenses incurred on account of the road, shall be certified by the county auditor into the treasuries of townships through which the road is located, proportionately to the amount paid for the making of the same in each of the townships, to be expended under the order of the township trustees in repairing the road.

SEC. 4849. The compensation of persons employed under this chapter shall be fixed by the county commissioners, and shall not exceed three dollars per day; but the surveyor or engineer and the county auditor shall receive such compensation for their services as is fixed by law for the compensation of the county surveyor and county auditor respectively for like services in other cases.

SEC. 4850. When any road to be improved under and by virtue of this chapter begins or terminates in the city or villages, the corporate authorities may, upon the recommendation of the county commissioners; they deem the same expedient, agree to pay in the bonds of such city or village, in the manner and proportions described in section [forty-eight hundred and forty-six], in addition to any amount that may be assessed upon the real property within such corporation by virtue of the provisions of this chapter, an amount not exceeding one-fifth of the

entire cost of the road; but the entire tax to be imposed for road purposes, by virtue of this section, shall not in any year exceed five mills on the dollar of the taxable property in the corporation.

SEC. 4851. When it is desirable or expedient to continue any road contemplated under this chapter, into or through an adjoining county, the city council of any city of the first or second class may, upon application and recommendation of the county commissioners of such county, if the council deem the same promotive of the general interests of such city, aid in the construction of the road to an extent not exceeding one-fifth of its cost, the payment of the same to be provided for in the manner and proportions described in section forty-eight hundred and forty-six.

SEC. 4852. All plats, profiles and surveys, on application for road improvements, when the application fails, and the county commissioners refuse to order the construction of the road, shall be carefully preserved in the office of the county auditor, and the county commissioners are authorized to use the same, if practicable, on any new application for the same road, or any part of the same road; and upon such use of plats, profiles or surveys, or any part thereof, the persons originally charged with the cost of the same shall be paid therefor, or such part thereof as may be so used, in the manner provided by law.

SEC. 4853. The commissioners may receive subscriptions and donations, in money or real or personal property, which shall be applied to the construction or improvement of the road, and may contract for and purchase such stone, gravel or other material as may be necessary for the construction and repair of the road.

SEC. 4854. If the commissioners and owners of such stone, gravel or other material cannot agree on a price deemed fair and reasonable, the commissioners may apply to the judge of the probate court of the county, or if such material is located in another county than that in which the road is located, then to the judge of the probate court of the county in which such material is located, to appoint appraisers to assess the value of the material; thereupon an order shall be entered of record in the office of such probate court, directing that notice in writing be served by the commissioners, upon the person whose property is sought to be appropriated, not less than ten days before the further proceedings herein provided for shall be had; and such notice shall contain a brief description of the property sought to be appropriated, and state the use to which it is put, and the time when further proceedings shall be had.

SEC. 4855. Upon the day so fixed, the probate court before whom such application is filed shall appoint three disinterested freeholders, who, after being duly sworn to impartially assess the value of the material, or any part of the same, shall enter upon the premises of the owner and assess the value thereof; and they shall also assess the damages that will accrue to the owner by the removal of the material through his premises, and shall, within ten days after their appointment, return their award to the probate court.

SEC. 4856. The judge of the probate court shall, upon the return of the award, furnish the commissioners, on application, a copy of the same, and also furnish a copy to the owner of the material; and thereupon, if neither party signify an intention to appeal to the court of common pleas, the probate court shall at once render judgment for the amount of compensation and damages awarded by the appraisers, and order that, upon payment of such sums and costs, the commissioners

may enter upon the lands, either enclosed or unenclosed, and remove such material as may be required to make the road.

SEC. 4857. An appeal from the decision of the appraisers to the court of common pleas may be allowed, if taken within thirty days after the rendering of the award; either party desiring to appeal shall give notice at the time, or within three days thereafter, of his intention to appeal to the court of common pleas, and thereupon the probate court shall require such appellant to enter into a bond, in a sum not exceeding the value of the property sought to be appropriated, conditioned that the appellant shall perform the judgment of the court of common pleas, and pay all costs and damages adjudged or ordered by such court; when such bond is filed, the probate court shall send all the original papers in the proceeding, with a certified copy of the journal entries made in the cause, to the clerk of the court of common pleas; and in that court a jury of twelve men shall be impaneled according to law, to try and determine the amount of compensation and damages that shall be awarded, and such proceedings shall be had as are provided by law to appropriate private property for public use; but such appeal shall not prevent the immediate entry upon the premises by the commissioners, for the purpose of taking material.

SEC. 4858. When any proposed road improvement contemplated by this chapter is in more than one county, applications shall be made by petition to the commissioners of each of the counties, and the commissioners of such counties, upon the petition and bond being filed in their respective counties, shall meet in joint session, at such time and place as the auditor of the county in which the principal petitioners reside shall appoint, in a notice to the auditor of each of the counties in which the petition has been filed; the auditor of the county in which the joint board meets shall be the clerk of the board, and furnish a certified copy of all proceedings to each of the counties interested; and in all subsequent sessions the joint board shall proceed in all respects according to the provisions of this chapter.

SEC. 4859. Applications may be made by the joint board, to the probate judge of the county in which stone, gravel or other material is located, to appoint appraisers to assess the value thereof, and damages, and like proceedings shall be had thereon as are provided in other cases; and any person feeling aggrieved by any decision of such appraisers may appeal from such decision to the probate court of such county, and such proceedings shall then be had as are provided for appeals in section forty-eight hundred and thirty-four, and such orders and judgments be rendered as are there provided for, and the necessities of the case may require.

SEC. 4860. When an assessment, made upon any real estate by virtue of proceedings had under this chapter, remains unpaid for the period of twelve months after the same becomes due, the auditor of the county in which such real estate is situated shall, unless otherwise ordered by the commissioners, place the same upon the general duplicate of the county for collection against the real estate so assessed, in the manner provided by law for making out duplicates for taxes on real estate; and the treasurer of such county shall thereupon proceed without delay to collect such assessments in any of the modes provided by law therefor.

SEC. 4861. Any road, or part thereof, constructed or improved by any corporate body, or otherwise, may, after the completion thereof, with the consent of the stockholders or contributors thereto, be relinquished and transferred, without consideration, to the commissioners

of any county in or through which it is located, with all rights and privileges appertaining thereto—such transfer or relinquishment to be evidenced by a written declaration, executed by the president and secretary of such corporate body, or by the other owners; and upon the deposit of such instrument of writing, duly executed, with the county auditor, the commissioners, if satisfied that such road has been built in such manner as to make a good and lawful turnpike, and that there are no debts against the same to be entered on record as a free turnpike, within the meaning of this chapter, and thereafter such road or part thereof transferred shall be a free road, and shall be kept in repair as provided in chapter ten.

SEC. 4862. The county commissioners of any county may purchase and make free any turnpike road, or part of such road, within the limits of their respective counties, on the conditions and by the procedure which are provided for the construction or improvement of roads in this chapter.

SEC. 4863. No person shall be permitted to take advantage of any error committed in any proceeding to lay out, construct or improve a road under and by virtue of this chapter, nor of any error committed by the county commissioners or county auditor, or by the engineer or surveyor, or other person, in the proceeding to lay out, construct or improve such road, nor of any informality, error or defect appearing in the record of such proceeding, unless the party complaining is effected thereby.

SEC. 4864. But the court in which any action is now pending, or may hereafter be brought, to enjoin, reverse or declare void the proceedings by which any such road has been laid out, constructed or improved, or ordered to be laid out, constructed or improved, or to enjoin the collection of any tax or assessment levied or ordered to be levied, for the purposes aforesaid, or of either, may, if there be manifest error in such proceedings affecting the rights of the plaintiff in such action, set the same aside as to him, without affecting the rights or liabilities of the other parties in interest; the court shall, on the final hearing make such order in the premises as may seem equitable and just, and may order the tax assessment levied against the plaintiff to remain on the duplicate for collection, or to be again levied in whole or in part, or may perpetually enjoin the same, or any part thereof; the costs of such action, and of the proceedings had therein, shall be apportioned among the parties, or paid out of the county treasury in whole or in part, as justice may require and the court direct; and this and the preceding sections shall govern actions or proceedings now pending, so far as the same are applicable.

ROAD LAW OF MASSACHUSETTS.

(Chapter 52, page 346, Massachusetts Public Statutes.)

PUBLIC WAYS AND BRIDGES.

SEC. 1. Highways, town ways, streets, causeways and bridges shall be kept in repair at the expense of the town, city or place in which they are situated, when other provision is not made therefor, so that

the same may be reasonably safe and convenient for travellers with their horses, teams and carriages, at all seasons of the year.

SEC. 2. When two or more towns are required by law to maintain or keep in repair a bridge upon a highway or townway, and differ as to the mode or time of doing the same, the county commissioners having jurisdiction to lay out highways in either of such towns to whom application is first made by one of the towns, may, after a hearing upon due notice to all parties interested, pass such orders concerning the maintenance and repair of such bridge as in their opinion the public good may require. Such orders shall be final, and shall be enforced in the same manner as other orders by the commissioners.

SEC. 3. Towns* shall grant and vote such sums of money as are necessary for making and repairing highways and townways, and such money shall be carefully and judiciously expended in making and repairing said ways by the road commissioners or by the surveyors of highways, each in his own district, when the town is divided into highway districts, and in such cases under the direction of the selectmen.

SEC. 4. The selectmen of every town having more than one surveyor of highways shall annually, before the first day of May, assign in writing to each surveyor the limits and divisions of the highways and town ways to be kept in repair by him.

SEC. 5. When there is a deficiency in the amount appropriated for the repair of highways or townways within the limits of any surveyor, or when said amount is not furnished or paid to him, so that he is unable to make such repairs, he may, to an amount not exceeding ten dollars, employ persons to make such repairs; and the persons so employed shall be paid therefor by the town.

SEC. 6. If a town neglects to vote a sufficient sum of money for the purpose of repairing the highways and townways of each of its surveyors in their respective districts or the road commissioners, (first having obtained the consent of the selectmen for that purpose in writing,) may employ persons to repair the highways and townways so that the same shall be reasonably safe and convenient for travellers at all seasons of the year, and the persons so employed shall be paid therefor by the town.

SEC. 7. Two-thirds at least of the money granted by each town for repairing highways and townways shall be laid out and expended for that purpose before the first day of July next after the same is granted, or at such other time or times as the town at a legal meeting called for that purpose shall determine.

SEC. 8. Every surveyor shall annually on the first Monday of July, and also at the expiration of the term for which he is appointed, render to the selectmen an account of all moneys expended by him on the highways and townways. For each neglect he shall forfeit a sum not exceeding fifty dollars.

SEC. 9. If any money remains unexpended in the hands of a surveyor at the expiration of his office, he shall pay the same to the town treasurer, who, after demand, may recover the same in an action of contract for money had and received, with twenty per cent. in addition thereto, to the use of the town.

SEC. 10. Surveyors of highways and road commissioners, except as is provided in the following section and in sections six and nine of chapter fifty-four, may cut down or may lop off trees and bushes, except

* In Massachusetts law, the word town has the same significance as the word township in Pennsylvania.

such as are needed for shade trees, and may dispose of the same, for the benefit of the highway, if the adjacent land owners neglect to cut and remove said trees and bushes, after thirty day's notice in writing; and may dig up and remove whatever obstructs or encumbers the highway or townway, or hinders, incommodes or endangers persons traveling thereon; and when such way is encumbered with snow, they shall forthwith cause the same to be removed, or so trodden down as to make the way reasonably safe and convenient.

SEC. 11. No surveyor, road commissioner or other person shall remove or take down fences, gates or bars, placed on a highway or town way for the purpose of preventing the spreading of a disease which may be dangerous to the public health.

SEC. 12. No surveyor of highways or road commissioner shall, without the approbation of the selectmen first had in writing, cause a water-course occasioned by the wash of a highway or townway to be so conveyed by the side of such way as to incommode a house, store, shop or other building, or to obstruct a person in the prosecution of business. Persons aggrieved by the violation of this section may complain to the selectmen or mayor and alderman, who shall thereupon view the water-course, and may direct the surveyor or road commissioners to alter the same in such manner as they shall determine.

SEC. 13. Towns may authorize their surveyors or road commissioners or any other person to enter into contracts for making or repairing the highways or townways within the same.

SEC. 14. The selectmen or road commissioners may enter upon, use or take any land for the purpose of securing or protecting a public way or bridge whenever in their opinion it is necessary so to do; and all damages sustained thereby shall be recovered in the manner provided for the assessment of damages occasioned by the laying out, alteration or discontinuance of townways.

SEC. 15. When an owner of land adjoining a highway or townway sustains damage in his property by reason of any raising, lowering or other act done for the purpose of repairing such way, he shall have compensation therefor, to be determined by the selectmen, road commissioners, or mayor and aldermen, with whom he shall file his petition therefor after the commencement and within one year from the completion of the work, and who shall finally adjudicate upon the question of damages within thirty days after the filing of the petition therefor, unless the parties agree in writing to extend the time. The benefit, if any, which the complaint receives by reason of such alteration or repair, shall be allowed by way of set-off.

SEC. 16. If the petitioner is aggrieved, either by the estimate of his damages or by a refusal or neglect to estimate the same, he may, within one year from the expiration of said thirty days, apply for a jury and have his damages ascertained in the manner provided where land is taken in laying out highways. Or he may, by agreement with the adverse party and upon application made within the same time, have them ascertained by a committee to be appointed in the city of Boston by the superior court, and elsewhere by the county commissioner in their respective jurisdictions.

SEC. 17. If the life of a person is lost by reason of a defect or want of repair of a highway, townway, causeway or bridge, or for want of suitable rails on such way or bridge, the county, town or person by law obliged to repair the same shall be liable in damages not exceeding one thousand dollars, to be assessed with reference to the degree of

culpability of the county, town or person liable, and recovered in an action of tort, commenced within one year from the injury causing the death, by the executor or administrator of the deceased person, for the use of the widow and children of the deceased in equal moieties, or, if there are no children, to the use of the widow, or, if no widow, to the use of the next of kin: *Provided*, That the county, town or person had previous reasonable notice of the defect or want of repair of such way or bridge.

SEC. 18. If a person receives or suffers bodily injury or damage in his property, through a defect or want of repair or of sufficient railing in or upon a highway, townway, causeway or bridge, which might have been remedied, or which damage or injury might have been prevented by reasonable care and diligence on the part of the county, town, place or persons by law obliged to repair the same, he may recover, in the manner hereinafter provided, of the said county, town, place or persons, the amount of damage sustained thereby, if such county, town, place or persons had reasonable notice of the defect, or might have had notice thereof by the exercise of proper care and diligence on their part; but no such damage shall be recovered by a person whose carriage and the load thereon exceed the weight of six tons.

SEC. 19. A person so injured shall within thirty days thereafter give to the county, town, place or persons by law obliged to keep said highway, townway causeway or bridge in repair, notice of the time, place and cause of the said injury or damage; and if the said county, town, place or persons do not pay the amount thereof he may within two years after the date of said injury or damage bring an action of tort in the superior court against said county, town, place or persons to recover the same.

SEC. 20. No person shall recover from a town, city, county or place, in any such action, a greater sum for damages or injury than one-fifth of one per cent. of the State valuation of such town, city, county or place last preceding the commencement of the action, nor a greater sum than four thousand dollars.

SEC. 21. The notice required by section nineteen shall be in writing, signed by the person injured or by some one in his behalf, and may be given, in the case of a county, to one of the county commissioners or to the county treasurer; in the case of a city, to the mayor, the city clerk, or the treasurer; and in the case of a town, to one of the selectmen or to the town treasurer or clerk; but if from physical or mental incapacity it is impossible for the person injured to give the notice within the time provided in said section, he may give the same within ten days after such incapacity is removed, and in case of his death without having given the notice, and without having been for ten days at any time after his injury of sufficient capacity to give the notice, his executor or administrator may give such notice within thirty days after his appointment.

SEC. 22. If, before the entry of an action under section eighteen, the defendant tenders to the plaintiff the amount which he would be entitled to recover, together with all legal costs, and the plaintiff does not accept the same, and does not recover upon the trial more than the sum so tendered, the defendant shall recover his costs.

SEC. 23. If a town neglects to repair any of the ways or bridges which it is by law obliged to keep in repair, or neglects to make the same reasonably safe and convenient when incumbered with snow, such town shall pay such fine as the court in its discretion may order.

SEC. 24. Except in cases where it is otherwise specially provided, fines imposed on a town for deficiencies in the ways and bridges within the same shall be appropriated to the repairing of such ways and bridges; and the court imposing such fines shall appoint one or more person to superintend the collection and application of the same, who shall make a return of their doings therein to the court.

SEC. 25. If on the trial of an indictment or action brought to recover damages for an injury received by reason of a deficiency or want of repair in a highway, townway, causeway or bridge, it appears that the county, town or person against whom such suit is brought, has, at any time within six years before such injury, made repairs on such way or bridge, such county, town or person shall not deny the location thereof.

PRIVATE WAYS AND BRIDGES.

SEC. 26. When four or more persons are the proprietors and rightful occupants of a private way or bridge, and three of them make application in writing to a justice of the peace to call a proprietor's meeting, the justice may issue his warrant therefor, setting forth the time, place and purpose of the meeting, which warrant shall, seven days at least before the time appointed for the meeting, be posted up in some public place of the town where such way or bridge is situate.

SEC. 27. The proprietors and occupants so assembled shall choose a clerk and surveyor, who shall be sworn. They may determine by a majority of those present the manner of calling future meetings, what repairs of the way or bridge are necessary, and the proportion of money and of labor and materials to be furnished by each proprietor and occupant for such repairs. The surveyor shall have the like powers with respect to such ways or bridges as are exercised by surveyors of highways.

SEC. 28. A proprietor or occupant refusing or neglecting to comply with such vote, when required by the surveyor, shall be held to pay him in money the amount of his proportion, with ten per cent. interest thereon, in an action of contract.

SEC. 29. If a person so chosen refuses or neglects to accept the trust and take the oath, he shall forfeit five dollars, to be recovered in the manner provided for the like neglect or refusal of a person chosen surveyor of highways.

SEC. 30. Damages and forfeitures recovered under the provisions of the two preceding sections shall be applied to the use of the proprietors for repairing said ways or bridges.

SEC. 31. The proprietors and occupants may, at a legal meeting for that purpose, authorize any person to contract by the year, or for a longer or shorter time, for making and keeping in repair such private ways or bridges; may vote to raise such sum of money as they may deem necessary for carrying such contracts into effect; and may choose assessors, who shall assess each proprietor and occupant for his proportion of such sum according to his interest in such way or bridge, and shall deliver the lists of such assessments to the surveyor, with proper warrants of distress, in substance as is prescribed by law for collecting town taxes.

SEC. 32. The surveyor may levy and collect such taxes in the same manner as collectors of taxes are empowered to collect taxes.

SEC. 33. If a surveyor neglects or refuses to pay over according to the direction of his warrant the moneys so collected, he shall be liable to

the same penalties as are provided for a like neglect or refusal of surveyors of highways to pay over moneys to the town treasurer.

SEC. 34. The provisions of this chapter shall apply to cities except as otherwise provided in their charters or in the acts in amendment thereof.

PROPOSED ROAD LAW OF NEW YORK.

Read in place in the Senate, February 26, 1890, by Hon. W. P. Richardson; read twice and referred to the committee on roads and bridges. Not finally acted on by the Legislature.

AN ACT.

To provide for the construction of State roads and to submit to the people, a law authorizing a loan for the payment of the cost thereof, and providing for the appointment of commissioners to supervise the same.

The people of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. Within ten days after the assembling of the Legislature, meeting next after the approval of this act by the people, as hereinafter provided, the Governor shall nominate, and by and with the advice and consent of the senate, shall appoint four competent citizens of this State, two belonging to the party which cast the largest vote for Governor at the last election for Governor of this State, and two belonging to the party which cast the next largest vote for Governor at such election, who shall be commissioners of State roads, and they are hereby authorized to borrow on the credit of the State, ten millions dollars, at a rate of interest not exceeding three per cent. per annum and reimbursable at such periods as shall be determined by the said commissioners, not exceeding eighteen years, from the time of making such loan. All provisions of law in relation to such loans made by commissioners of the canal fund, and the issue and transfer of certificates of stock, shall apply to loans authorized by this act, so far as the same are applicable.

SECTION 2. The moneys realized upon such loan shall be applied exclusively for the payment of the cost and expenses of surveying, laying out and constructing State roads in the several counties of this State, not in cities nor incorporated villages, in accordance with the provisions of section nine of this act, and for no other purpose whatever.

SECTION 3. The sum of two million dollars is hereby appropriated, out of any money received into the treasury arising from such loan, to be paid by the Treasurer on the warrant of the comptroller, upon the requisition of said commissioners or a majority of them, for the purpose of carrying on the construction of said roads.

SECTION 4. An annual tax is hereby imposed, and shall be levied and collected in the same manner as other State taxes are levied and collected, sufficient to pay the interest and redeem the principal of the loan hereby authorized, within eighteen years from the time of the contracting thereof. The comptroller shall ascertain and determine what sum,

being applied in payment of principal and interest, in the first year after the tax can be collected as aforesaid, and in each succeeding year thereafter, within the period of eighteen years from the time of contracting said loan, will be sufficient to pay the interest and redeem the principal of said loan within said period of eighteen years; and shall in each year apportion the sum so required among several counties of this State, according to the then last corrected assessment-rolls returned to his office, and shall give notice of such apportionment to the boards of supervisors of the respective counties. It shall be the duty of the boards of supervisors of the respective counties to cause the amount so apportioned in each year to be levied, collected and paid to the Treasurer of this State, in the same manner as other State taxes. The money collected and paid into the treasury under this section shall constitute a sinking fund to pay the interest and redeem the principal of the loan contracted pursuant to this act, and shall be sacredly applied to that purpose; and if, at any time, the sinking fund shall be insufficient to comply with the requirements of this section, the comptroller shall increase the sum thereafter to be levied and collected by tax in each year, so as to make the fund adequate for the purpose aforesaid.

SECTION 5. This act shall be submitted to the people of this State, at the next general election, in accordance with the provisions of section twelve of article seven of the Constitution of this State, and the votes given for its adoption shall be indorsed "constitutional loan," and shall be in the following form. "For a loan of ten million dollars for the construction of State roads;" and those given against its adoption shall be indorsed "constitutional loan," and shall be in the following form: "Against a loan of ten million dollars for the construction of State roads." The inspectors of the several election districts in this State shall provide a separate box, in which the ballots given in pursuance of this act shall be deposited. The ballots shall be canvassed and returned, and the result shall be determined and certified in the same manner as votes given for the office of Governor of this State. If a majority of the votes cast, pursuant to this act, shall be "for a loan of ten million dollars for the construction of State roads," then the preceding sections of this act shall take effect, but if a majority of the votes so cast shall be "against a loan of ten million dollars for the construction of State roads," then the said sections shall not take effect but shall be inoperative.

SECTION 6. If a majority of the votes cast pursuant to the provisions of this act, shall be "for a loan of ten million dollars for the construction of State roads," within twenty days after their appointment the said commissioners of State roads shall meet in some room in the capitol, at Albany, which shall be provided for their use by the superintendent of public buildings, and shall then and there determine by lot, which of said commissioners shall serve as such for two years and which for four years, and shall so determine that one of the commissioners who belong to the political party which cast the largest number of votes for Governor at the then last election for Governor in this State, shall serve two years, and the other commissioner belonging to said party shall serve for four years, and that one of the commissioners who belongs to the political party which cast the next largest number of votes for Governor at said election for Governor shall serve for two years, and the other commissioner belonging to said last-named party shall serve for four years. Two of said commissioners shall serve for two years and two thereof shall serve for four years, and they shall

serve without compensation, but their actual and necessary expenses and disbursements, incurred or made, in the discharge of their duties under this act, shall be allowed and paid to them out of the moneys received on such loan, upon vouchers to be approved by the comptroller. In case any vacancy occurs in the office of a commissioner before the expiration of his term of office, by reason of his death, resignation, inability to serve, or removal from this State, or otherwise, the same shall be filled for the remaining portion of his term in the same manner as is hereinafter provided for the appointment of a successor to any such commissioner upon the expiration of his term of service.

Upon the expiration of the term of service of any commissioner of State roads, if the same occurs during the session of the Legislature, his successor shall be appointed by the Legislature in the manner provided by law for the election of senators to Congress, except that the election may take place at any time during the session of the Legislature, as it may determine, and such successor shall belong to the same political party as the commissioner whom he succeeds. In case such expiration shall occur after the final adjournment of one Legislature and before the assembling of the next Legislature, the Governor shall appoint a successor from the same party to which the predecessor belonged, who shall hold office until twenty days after the assembling of the next Legislature, when the Legislature shall select and appoint a commissioner in his place for the full term of four years, from the same political party to which such predecessor belonged.

SECTION 7. The commissioners of State roads, herein appointed, shall select, by ballot or otherwise as they may determine, one of their number as chairman of their board, and another thereof as secretary thereof, and may employ a clerk and such other subordinate assistants as they may require to carry out the provisions of this act, but the aggregate of salaries for clerk and assistants shall not exceed the sum of ——— dollars annually.

SECTION 8. The State engineer and surveyor shall determine the character and kind of roads that shall be constructed under this act, with the approval of the said commissioners, and the said commissioners shall suitably advertise for bids for the construction thereof in separate parcels, designated by line of route and termini, which bids shall, at a day and an hour fixed in such advertisements, in the presence of said commissioners, be opened by their chairman and each separate parcel or route shall be let to the lowest responsible bidder or bidders therefor, who offers to complete the same within a time fixed in such advertisement; unless such commissioners shall determine that such lowest bid is in excess of a reasonable remuneration for the work and materials required for such work, in which case such work shall again be advertised under like provisions.

SECTION 9. The State engineer and surveyor shall, under the direction and control of said commissioners, project such State roads, and cause the same to be properly surveyed in the several counties of this State outside of cities and incorporated villages, in such a manner as to connect, by means thereof, the county seats of adjacent counties or such other points in said counties of greater importance as he may judge best, to serve the interests of the public, using for such purpose, so far as practicable, the land already devoted to public roads in each case. Whenever the inhabitants of any county shall disapprove the line of route thus selected by the State engineer and surveyor, they may, at

any time before the acceptance of any bid for the construction of such road or roads petition the said commissioners to be heard in opposition thereto, and if on the hearing such commissioners are satisfied that any modification or change of route as shall be asked for by said inhabitants will best subserve the interests of the public and will involve no considerable increase of cost, it shall be their duty so to certify to the State engineer and surveyor who shall thereupon cause such route to conform to the modification or change which the said commissioners shall approve.

PROPOSED ROAD LAW OF NEW YORK.

Read in place, twice read and referred to the Committee on Roads and Bridges. Not finally acted on by the Legislature.

A BILL.

Relating to the construction, maintenance and repair of the highways and roads in the State of New York.

The people of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Governor, by and with the advice and consent of the Senate shall, within thirty day safter the act is passed, appoint a competent civil engineer, who shall be known as the State Superintendent of Highways. He shall hold office for the term of three years from the date of his commission, or until his successor is appointed and qualified. He may be removed by the Governor, for cause, and the vacancy shall be filled in the same manner as the original appointment way made. He shall be paid an annual salary of five thousand dollars, together with his necessary traveling and office expenses, incurred in the discharge of his duty. He shall have his office at the capitol in the city of Albany.

SECTION 2. The State Superintendent of Highways shall have general advisory supervision of the public highways and roads in the several counties in the State. He shall collect and keep in this office, reports and statistics of the condition of the principal roads of the several counties of the State, describing the nature of the soil, extent and character of the grades, and the necessity of alterations or improvements.

He shall file and keep in his office all specifications, statistics and reports in reference to any of the improved or unimproved highways and roads, that shall be prepared or collected by him, and he shall file maps of all highways improved as provided by this act. All such maps, specifications, statistics and reports shall be open to public inspection at all reasonable hours. Whenever the board of supervisors of any county of the State shall decide to improve any of the highways or roads in the county, as herein provided, it shall be the duty of the State Superintendent of Highways to recommend to the board of supervisors and to the county engineer and surveyor, to be appointed as herein-after provided, such method or system of alterations and improvement as in his judgment shall be best. He shall perform such other duties as may be required of him for the proper enforcement of this act. He may be consulted at all reasonable times, without charge, by any of the

officers of the counties, cities or towns having authority over any public highways or roads, relative to the construction, repair, alteration or maintenance of the same.

SECTION 3. It shall be lawful for the board of supervisors of any county in this State to acquire, improve, maintain and assume full and exclusive control of any of the public highways or roads, or parts thereof, in their county, so far as may be necessary for the purpose of improving and maintaining the same as a road for carriages and other vehicles. In order to acquire and assume such control, in any county, with power to improve and maintain the same, the board of supervisors shall cause a map to be made, or adopt a map already made, on which the principal public roads or highways of the county shall be, or are laid down, and shall cause the roads, or parts of roads, which the said board intend to acquire and assume such control of, to be plainly indicated thereon, and shall file the said map, when so marked, in the office of the clerk of the county, and shall procure a copy thereof to be made and filed in the office of the State Superintendent of Highways, whereupon the highways and roads, or parts of the highways and roads so marked or indicated on the said map, shall become and be known as "county highways," and shall thereafter be improved, maintained and kept in a safe and convenient condition as aforesaid, exclusively, in the manner provided in Sections 4, 5, 6 and 7 of this act; and it shall be lawful for the said board to relinquish control of any highway or road, or part of any highway or road, so acquired and marked, and to acquire and assume control of other highways or roads, or parts of highways or roads, in the county, from time to time, with the same power to improve and maintain the same, in either of which cases the said map shall be changed accordingly; in acquiring or assuming control of any public highway or road, or relinquishing the same, the said board shall accurately describe such highway or road in a written resolution and file one copy thereof, certified by the clerk of the board, in the office of the county clerk, who shall record the same in a book to be provided and kept for that purpose, and said board shall also file a copy of said resolution in the office of the State Superintendent of Highways.

SECTION 4. It shall be lawful for the board of supervisors to cause the said county highway, or any part thereof, to be graded, paved, macadamized or otherwise improved by means of stone or gravel, for a width of at least fifteen feet whenever such improvement may be required to keep the same constantly in good condition due consideration being given to the recommendation of the State Superintendent of Highways. All such pavements or other improvements (except repairs on any one road costing not more than one hundred dollars) shall be done under contract with said board; but no contract for any such work shall be awarded, or be valid for any purpose if awarded, unless due notice, specifying the work and material, and inviting bids or propositions to furnish the same, shall have been published for at least three weeks at least once in each week, in one or more newspapers published and circulated in the county. Every contract made for improving any county highway or part thereof, shall be based upon carefully prepared specifications of the work and material required, to which reference shall be expressly made in the contract; and no money shall be paid or any work done or materials furnished, unless the same shall have been done or furnished in strict conformity with the terms of the contract and specifications, and the same shall have been approved by the county engineer and surveyor, as shall appear from his cer-

tificate in writing; and no contract shall be awarded, or be valid for any purpose if awarded, unless the person or party whose bid or proposition is accepted, shall at the time of signing the contract, execute a bond to the board of supervisors with sufficient sureties, to be approved by the county treasurer, conditioned for the faithful performance of the contract; the penal sum of such bond shall be at least one-half of the amount of the contract price for the work and materials; all such contracts and bonds shall be held by the county treasurer. The said board may give the notice aforesaid and award contracts for parts or sections only, of the improvements intended to be made, and may reject any or all bids.

SECTION 5. It shall be lawful for the board of supervisors to cause a special tax to be levied, which shall not in any one year exceed the sum of twenty-five thousand dollars, nor one-fourth of one per centum of the assessed value of the taxable property in the county; or the said board of supervisors may issue bonds of the county, bearing interest at not more than five per cent. per annum, to be known as county highway bonds, for the purpose of raising money to pay the cost of paving, macadamizing or otherwise improving the said county highways, or any part thereof, in the manner aforesaid; but prior to the issuing of any such bonds the said board by its chairman and clerk shall make an application to the county court of the county, in writing, setting forth the assessed value of the real estate therein for the purpose of taxation, in the year next preceding, together with a statement of the entire debt of the county for all purposes, and of the amount of county highway bonds which they propose at that time to issue; whereupon the said court shall fix a time to hear such application, whereof such notice by publication shall be given as the court shall direct; and at the time and place so stated the court shall proceed in a summary manner to investigate the accuracy of the statements contained in the application and shall make a certificate setting forth the assessed value of the real estate in the county for the purpose aforesaid in the next year preceding, and the total amount of the debt of the county for all purposes as found by such investigation, which certificate shall be entered at length on the minutes of the court, and filed in the office of the clerk of the county, and no county highway bonds shall be issued to such an amount that the entire debt of the county for all purposes, including existing indebtedness, shall exceed five per centum of the assessed value of real estate therein, as such debt and assessed value of real estate are shown by such certificate; and in case any such bonds shall be issued in excess of the limit aforesaid, all such bonds so issued in excess, shall be void in the hands of any person or parties, notwithstanding any recitals therein, or any representation that may be made concerning the same; such application must be repeated in case of every other proposed issue of such bonds, but in no case shall any board of supervisors issue bonds under this act so that the amount of such bonds outstanding at any one time shall exceed the sum of one hundred and fifty thousand dollars.

The term of the bonds issued for highway purposes shall not exceed twenty years, and a sinking fund shall be created on the issuing of the said bonds, for their redemption, by raising annually a sum which will produce an amount equal to the sum of the principal and interest of said bonds at their maturity.

SECTION 6. Whenever any road which shall be acquired by the board of supervisors for improvement pursuant to this act, passes through any

incorporated city or village, it shall be the duty of the board of officers of the city or village having charge and control of the streets and highways of the city or village, to cause that portion of the highway in and through the said city or village, to be improved in the same manner as the said highway is being improved outside of the corporate limits of the city or village, unless the State Superintendent of Highways shall duly certify under his hand, that that portion of the highway in the city or village is substantially in as good order and condition as the balance of the improved highway, which certificate shall be filed with the clerk of the city or village, and a copy thereof filed with the clerk of the board of supervisors.

SECTION 7. The board of supervisors shall annually appoint a competent engineer to be known as the county engineer and surveyor, at a reasonable compensation to be annually fixed by the board, whose duty it shall be to survey the public highways, roads and lanes of the county, or any part thereof when necessary to prepare specifications for pavements or other improvements intended to be made in pursuance of the provisions of this act, and to supervise the work and material used; after such improvements or any part thereof shall have been completed, the same shall be kept in repair at the expense of the county, and it shall be the duty of the county engineer and surveyor to inspect the condition of the county highways from time to time, so far as the same may have been improved, and such county engineer and surveyor shall have power to cause necessary repairs to be made to the pavements or other improvements made under this act, except in case of sudden and extraordinary damage, repairs costing more than fifty and not more than one hundred dollars, shall be made only by authority of said board, or a committee thereof, and repairs costing more than one hundred dollars shall be made only by direct authority of said board.

All bills or claims for making repairs or furnishing materials therefor, after being approved by the county engineer and surveyor, shall be rendered to the said board by the party who performed the work or furnished the material used, or to be used, and no bills or claims for repairs shall be paid unless the same shall have been made strictly according to the provisions and directions of this act. The said county engineer and surveyor immediately after his appointment, shall give a bond to the board of supervisors in the penal sum of two thousand dollars, to be approved and held by the county treasurer, conditioned for the faithful performance of his duties, which bond shall be filed with said county treasurer.

SECTION 8. That portion of any road acquired and improved by the board of supervisors, pursuant to this act, and known as a county highway, situated within the corporate limits of cities and incorporated villages, shall be kept in repair by the local authorities of the cities or incorporated villages in and through which said road extends, after such road shall have been actually improved by the board of supervisors as provided in this act.

SECTION 9. All roads in the county not acquired and improved by the board of supervisors, except private ways, and roads controlled by turnpike companies shall be known as public roads, and shall be maintained, improved and repaired by the highway authorities of the cities, villages and towns wherein the same are located. All such repairs and improvements that may cost more than one hundred and fifty dollars shall be done under contract with the city, village or town, and in accordance with specifications prepared by the officers of the city or village having

charge of the streets and highways therein, and by the commissioners of highways in the towns, by and with the advice and assistance of the county engineer and surveyor. The commissioners of highways of each town shall annually deliver to the supervisor of such town a statement of the improvements necessary to be made on the public roads of the town, together with the probable expense thereof, and the supervisor shall lay the same before the board of supervisors at their next meeting. The board of supervisors shall cause the amount so estimated to be assessed, levied and collected in such towns, in the same manner as other town charges, and all moneys raised and collected for highway purposes upon the taxable property of any town, as provided in this section, shall be paid over by the town collectors of taxes to the commissioners of highways of the town in which said moneys are so raised and collected, and to no other officer or person whatsoever. Nothing contained in this section, referring to the collection of taxes, shall be construed to apply to cities or incorporated villages having authority under their charter to repair and maintain streets.

SECTION 10. This act shall not apply to the city and county of New York.

SECTION 11. Articles second and third of title one, chapter XVI, part one of the revised statutes, and all acts or parts of acts providing for "assessment for highway labor," and providing that inhabitants and land owners shall be assigned to work on the highway in lieu of paying taxes for the maintenance and repair of roads, are hereby repealed. Nothing in this section contained shall be construed to limit the powers now given by law to highway commissioners and overseers, to call out persons to work, when the highways are obstructed by snow or otherwise.

SECTION 12. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

SECTION 13. This act shall take effect immediately.

THE SCIENCE OF ROAD-MAKING.*

By CLEMENS HERSCHEL, Esq.

The considerations which determine the best location of a road are those arising from the nature of the travel it is proposed to accommodate: that is, from the admissible grades, radii of curves, &c. Given two points it is desired to connect, with no intermediate point where the road is to touch, that route is the best which will cost least to build and maintain, the grades and curves being kept within bounds; and to find this location constitutes the whole problem of the engineer.

The Romans built all their roads in perfectly straight lines, up hill and down, at very great expense, as being absolutely the shortest dis-

*This essay received the first prize offered by the Massachusetts State Board of Agriculture; the requisition called for "Treaties upon the science of road making, and the best methods of superintending the construction and repair of the public roads in this Commonwealth." It was afterwards published by the League of American Wheelmen. Only portions of it have been used in this report.—SECRETARY.

tance between two points. At a later period in history it was argued that a road must be winding to be agreeable, and many were so built only for this reason. The modern road builder or engineer in general, ignores any such considerations, and has for his aim only to achieve the most, at the least present and future expense.

The regulations of different countries having a long experience in road building, such as France, Prussia, Baden, &c., vary somewhat, but the following is the general result:

In treating of roads, it often renders the subject much clearer to divide them into three classes; first, second, and third class roads, or, as we might also say, State, county, and town roads. Accepting this nomenclature, we have this: For first class or State roads, the greatest inclination should not exceed three to five in a hundred; second class or county roads, five to seven in a hundred; third class or town roads, seven to ten in a hundred. A road rising ten in a hundred is not supposed ever to have any heavy teams upon it. In ascending a hill it is well and proper to decrease the grade as the top is reached, and in the same measure as the horses get tired. Thus, if a first class road starts up hill with a grade of four and one-half per hundred, it should gradually diminish to four and three and one-half in a hundred, and end near the top with a grade of three in a hundred. If a grade of four or five in a hundred must needs be kept up for some distance, then it is well to have resting places forty or fifty feet long, having a grade of only one and one-half or two in a hundred, in the line of the road at proper intervals. An expedient adopted by Telford, the eminent English engineer, in order to avoid making a piece of road a mile long, on a less grade than five in a hundred, on account of the increased cost this would have occasioned, and yet not have this part of the road too much more tiresome for the horses than the rest, was to make the road-surface on this mile of a much better quality than on the remainder; the additional cost required for the improved road-bed amounting to only about one-half of what it would have cost to reduce the grade to say four in a hundred.

When the height of a necessary embankment gets to be more than sixty or sixty-five feet, a bridge or viaduct will be found cheaper; and the same measure, sixty feet, applies in case of tunnels, they being cheaper at that depth than open cuttings.

Under the head of laying out roads, something should be said of their width. Speaking only of such roads as are not apt to turn into streets from their proximity to towns and cities, it is well not to make them too broad, for the less the width, the less the cost of construction and maintenance, and a good twenty-three foot road is much better than a poor one forty or more feet wide. Each rod (sixteen and one-half feet) in width adds two acres per mile to the road. An agreeable form of road is to have on each, or on one side of the same a strip five or six feet wide, sodded, and then a sidewalk equal in width to one-eighth the width of the roadway. The intervening strip above mentioned is planted with trees, and at intervals of 200 to 250 feet furnishes storage places, thirty or forty feet long, for the materials used in the road repairs. The width of first, second, and third class roadways may be given as twenty-six, eighteen and one-half and thirteen feet with a tendency during the last ten years to have none, except in the vicinity of cities, wider than twenty-four feet, and the rest correspondingly narrower. In view of the changes constantly going on in this country in the value and settlement of land, it would probably be well always to

lay out a road fifty or sixty feet wide, but to build the road proper of the width above indicated.

The drainage of roads is of two kinds, surface and sub-drainage. The first provides for the speedy removal of the rainfall on the surface of the road and the cutting and embankments on which it is carried; the second for the removal of that part of the rainfall which nevertheless does penetrate into the body of the road covering. With a perfect sub-drainage the winter's frost having no water to act upon within the body of the road is robbed of its great power to destroy the same, and it also prevents the road surface from becoming soaked and thence destroyed in the summer. The need of surface drainage is self-evident. This last named is to be provided for at this stage of the building of the road, the sub-drainage being more properly a part of the building of the road covering or top.

For this purpose ditches, one on each side generally, are absolutely necessary both when the road is on a level with the surrounding country and when it is in a cutting. They may become necessary also in the case of embankments; for example, when an embankment is built across low ground. Where these side ditches cross under the embankment we have a culvert; also whenever any small valley having a constant or intermittent stream of water is crossed by such an embankment. It is very bad policy to make such culverts of wood, unless indeed they are so situated as to be constantly under water; the cost of replacing them after the embankment and road has been built over them being disproportionately great. They should be made of stone or brick; lately, cement drain-pipe, oval or egg shaped, has been used to advantage in their construction.

All ditches, drains and culverts should have a fall throughout their entire length. Their size will depend on the amount of water they may be expected to carry, and this again on the rainfall that may occur on the area which they drain. Extraordinary showers have occurred of two inches in half an hour, but only over a very limited area; and two inches in an hour may be taken as a large allowance. This is the basis of Central Park drainage calculations, and is larger than usually taken, but none too large, however, for safety.

MAKING THE ROAD-BED.

Under this head are included earthworks, drains, culverts, bridges, stay-walls, &c., &c., all matters requiring a special kind of skill to construct properly. The writer believes it impracticable to write a book which shall at once be interesting to and therefore valued by the public, and of value to the professional man, and thinks an attempt so to do results always in a failure in both directions. True to the determination expressed in the introduction, he proposes, therefore, to treat under this head mainly with those parts of the subject in which the public at large is most interested; for example, the data for the cost of earthworks, general information relating to drainage, bridges, &c.

To make a good road surface is a very simple operation after it is only once understood, and the fundamental principles thereof once comprehended, they can hardly be forgotten.

Everything connected with the construction, the use and maintenance of roads, was, in times past, before the invention of railways, the subject of exact observations and experiments, many and varied in their character. Besides this, we have the results of a great number of years

of experience in older countries, and there would seem to be little to invent, but much to learn, in this branch of construction. Though less progressive than other branches, there are, nevertheless, improvements in road-making, especially in road-making machinery and tools; and no treatise on this or any other living subject can be considered complete a very few years after it is written.

Ancient roads were made with a surface as nearly resembling the solid rock as possible. So, in China, roads were made of huge granite blocks laid on immovable foundations. In time these became worn with ruts, especially in the joints or seams of the stones, and the surface generally so smooth that animals could hardly stand, far less trot on it. They are now for the most part deserted, and left to be covered up by land-slides, etc., to one side of the new roads of travel.

The invention of McAdam consisted in having no large stone at all on the roadway, but having it all pounded into small fragments and spread over the road-bed. This has without fear of efficient contradiction or shadow of doubt, been proved by trial to be a worthless proceeding, though at one time popular, and even now only too often done, either from ignorance or laziness. The separate fragments of stone, having no bond among themselves, are liable to sink into the underlying ground or road-bed, evenly or unevenly as it may chance, more in one place than in another, and thus never come to rest or to an even top surface. Between these two extremes of an ancient Chinese solid rock road and that of McAdam lies the true principle of road-making, which consists in giving every road two component parts; one—the foundation,—to be solid, unyielding, porous, and of large material; the other—the top surface—to be made up of lighter material, and to be made to bind compactly and evenly over the rough foundation. This constitutes the whole principle to be followed; and let it be repeated, that to dump the road material directly on the ground, without first preparing a foundation for it as it is so frequently done, is a waste of time, labor and materials, by no possibility resulting in a good road. On this one fundamental idea, which is never abandoned, however, there are a number of variations. Besides these roads, whose characteristics is the foundation they are all built on, we have paved roads, or pavements, of a great many kinds, and roads with trackways, also of various kinds.

The roads of this kind, with macadam for the top surface, are called Telford roads by English writers, from Telford, who first built them in England. The Central Park "gravel roads" belong under this head, gravel taking the place of the macadam of the Telford roads. These foundation roads are of far greater importance than any other kind for State, county or town roads, also for parks and driveways. The top surface of all these roads must have a certain inclination to cause efficient surface drainage. Various authorities give various rules for the amount of this inclination or side-slope. It would seem just that it should depend on the nature of the top covering, being less or more solid than for looser or softer materials, and also on the grade of the road.

In Baden, one of the smaller German States, but which is worthy to be taken as a model in matters of road building, and in France, the rise at the centre is given as $\frac{1}{40}$ — $\frac{1}{50}$ of the width of the road, according to the nature of the material; that is, inclinations of 1 in 20, and 1 in 30. The rules in Prussia prescribe inclinations of 1 in 24 for roads falling more than 4 in a hundred; and 1 in 18 for roads on a grade of

between 2 and 4 in a hundred; and 1 in 12 for those in a grade of less than 2 in a hundred. When first built, the centre should be made some four inches too high to allow for after settling.

If the stone for the foundation—for which most anything will do, and that kind should be taken which is cheapest to procure—happens to be got out cheapest in larger pieces than the above dimensions, it will do no harm. This foundation course is sometimes set so as to present an inclination on top, and the cover then put on of a uniform thickness over the whole breadth. This is perhaps best, but is somewhat more expensive. It will do, in nearly all cases to set the foundation course on a level, or as near, so as the stones will allow, and then make the top crowning, by making the covering say three-quarters of an inch or an inch less thick at the edges than in the centre. The stones forming the foundation should not be set in rows, nor ever laid on their flat sides, but set up on edge and made to break joints as much as possible; that is, set up irregularly. After they are set up, the points that project above the general level may be broken off, and the interstices generally filled up with small stone. More or less care and work are necessary in this part of the operation according to the importance of the road and the depth and character of the material used for the top covering. To roll the road at this stage is to be recommended; afterwards it becomes a requisite. The point never to be lost sight of, is that this foundation course must remain porous, must be *pervious* to water, so that all rain-water that shall soak through the top covering will find, through it, means of escape to the ground underneath; thence according to the nature of the sub-soil, it is left either to soak into the ground or must be further led away by appropriate drains.

Of very great importance is the *material* used for the top or road covering. In the order of their value for macadam, we have: I. Basalt; II. Syenite and Granite; III. Limestones; IV. Sandstones.

It will be evident that a very much greater quantity of the soft stones would be required to repair a certain road, than of a harder kind, and on a road lying out of the way of a hard stone quarry or deposit, the question will arise which is cheapest—to pay more for the raw material and get a good stock, or pay less and use the worse. There have been some interesting results in places where this matter has been the subject of experiment, continued for a number of years. Thus on a road in Baden which was formerly macadamized with rock costing only fifty cents per cubic yard, it was finally found cheaper to take harder rock from a distance, costing \$1.78 per cubic yard, the saving being both in less quantity of material used, and less labor required in repairs. Just where the limit is, must be found in each case by long-continued experiment, which it is well worth the trouble to make, both to save expense and also to have the best possible road, the harder material making a road better at all times, at the same or less cost. After the right kind has been determined, none other should be mixed with it, and should any inferior piece accidentally or designedly get into the stock to be broken up it should be picked out and thrown aside. The stone is broken up into macadam, either by hand or machinery. Wherever any considerable quantity of macadam is in present or future demand, a stone-breaker is certainly a saving over hand labor, though it is difficult to draw the line exactly, where hand labor or machine labor is cheapest. Probably, no town that pretends to keep thirty or forty miles of road in good repair ought to be without one of these labor-saving machines. Those most in use, and the best adapted for this work are made by the Gates Iron works of Chicago, Ill.

When broken by hand and for country roads, the stones should be broken on the storage places already mentioned, which are to be established along the side of the road every 200 to 250 feet. The laborer is not to pound the stones on a heap of such, but to use one large stone as a sort of anvil to break the others on. He is to use a light hammer, except for pieces containing more than four or five cubic feet, and may use a ring with a handle attached to hold the stone he desires to break.

In order that the road shall get an even surface, the macadam must all be of one size, and the proper size for the macadam depends on the degree of hardness of the rock. If too small it turns to dust, if too large the top will not pack even. The size is regulated by the use of a ring as a gauge—every stone being obliged to be capable of falling through this ring in any direction it may be dropped. Hard stones should be 1 to 1½, softer ones 1½, and the softest two inches in diameter. Larger sizes give less perfect roads. In loading and otherwise handling macadam a many and close-pronged pitchfork should be used instead of a shovel, so as not to mix in any earth or sand, and to sift out the stone dust and chips. The macadam being properly prepared and loaded up, it is spread over the foundation in two or three successive layers. Each layer should be rolled, but the top and last one must be rolled to make a good road. Nor will rolling alone do the work. Two other helps are needed—the use of a binding material, to act as a cement between the broken stone, and sprinkling. It is difficult to prescribe in words just what to use as a binding material and just how much to sprinkle and roll; common sense will in most cases be a safe enough guide. In the macadamized streets of Paris the rule is to roll till a single piece of macadam placed under the roller, will be crushed, without being pressed into the road surface. Gravel somewhat mixed with clay by nature, but not too much, is probably best as a binding material. Clean, coarse sand is very good. Other substances will do, where it would cost too much to procure either of the above.

Before leaving the subject of macadam top roads, it ought to be mentioned that a bed of rubble stone, 10 or 12 inches deep, merely spread uniformly over the road-bed as a foundation, is better than nothing at all, but can never make the same quantity of road as the rough paving described above.

Instead of the macadam top described in the preceding articles, screened gravel may be used. These roads are the favorite ones in Central Park, New York, and are probably the best roads there are for pleasure drives. It is a matter of some doubt yet whether they do as well for heavy trucking as they do for light vehicles. The foundation for these gravel roads should be the same as the rough paving for the macadam road, some pieces were built in the Central Park, having a rubble stone foundation, but they are not recommended by their builders. The gravel to be used for the top must be selected with some care; it should be of a hard kind of stone, clean, that is, free from clay, etc., of the right color, etc. It is put on in two layers, each rolled, and the top one made compact and firm, by spreading and mixing in some good binding material, sprinkling and rolling. There need be no fear of making a poor road by using the smoothest, most water-worn pebbles, free from all sand, etc., in making a road-top. The upper portions of the river Rhine are remarkable for the clean, smooth pebbles that form its bed to a very great depth. These pebbles are dredged up and used in road-building, making an excellent road-covering at a small expense. There are many miles of such roads in Baden and in the Bavarian Rhine Provinces.

After a road has been properly rolled, and the surface made compact and smooth, it should always be maintained in that condition, no matter how great is the amount of travel on it. "A stitch in time saves nine," here as well as elsewhere. The tendency is to produce ruts; these gather water; this soaks into the road-bed and spoils the whole. The problem can be put in this way: To have a good road, it is necessary that there be no dust or mud on the same, and that there be no ruts; therefore, remove the dust and mud as fast as they are formed, and fill up the ruts as fast as they are made. The whole matter is here in a nut-shell. It may be thought, at the first view, that this is too expensive a system. Its principal beauty lies, however, in the fact that it costs less per mile of road kept one year than the pernicious system of annual or semi-annual repairs, as will be shown and proved. The above two rules—sweep off the mud and dust as fast as they are formed, and fill up the ruts and bad places with new materials as fast as they appear—are all that is necessary to be carried out in order that there be continually a good road. Without continual repairs there can be no such thing as a constantly good road—a proposition that cannot too often be repeated. By repairing a road annually, or twice a year, it matters not which, the result is, strictly speaking, a good road at no time during the whole year. The road is wretched just after repairs; it becomes passable after a while, and deteriorates from that day forward, until it is again made wretched; and so on, *ad infinitum*, according to the present only too commonly followed system. By the other method is offered us a road as smooth as a floor, year in, year out, and, let it not be forgotten, at a less expense.

A German engineer expresses himself as follows: "It costs no more," says he, "to keep the roads in repair now than it did twenty years ago, when this method of continual repair was not in use, although labor is now three times and materials are twice as dear as they then were." There seems to be no doubt of the superiority of the continual repair system, in every respect producing very much better roads and at the same time costing less. It need only be tried with us to be thenceforth adopted.

We suppose the material for the road-covering to lie in regular measured heaps, all ready to be used, at the storage places, once or twice before mentioned, as being 200 to 250 feet apart along side of the road, but not encroaching upon it. Then, for every two or three miles of road, a so-called road-keeper is employed to do the necessary work and repairs. An enumeration of his duties will comprise at the same time an essay on the art of road repairing.

1. The road-keeper is to remove the dust formed in dry weather by sweeping with a brush broom. This is done to greater advantage just after a slight shower. In muddy weather, it is essential that the mud be removed by means of brooms or hoes. A little mud on the surface causes ruts, and much mud softens up the whole road surface. The mud is to be raked up in heaps alongside of the road, there left to dry and then carted off. To hinder as much as possible the formation of any mud, the surface drainage must remain unimpaired; should it be out of order, the water standing on the road is to be swept off. To diminish the wear of the road of dry times, the road should be sprinkled.

2. Inasmuch as the covering gradually wears off, notwithstanding all precautions, it must be renewed, and should be so renewed gradually in

the same measure as it wears off. The best time to put on new road metalling is during continuous wet weather.

3. In filling up holes, the bottom of the same is to be swept clean of mud, then filled up level with the remainder of the road, not in a heap so high above it as to obstruct travel.

Every care should be taken to have the new material join as speedily as possible with the old portion of the road, and it should be so well laid that it will give the least possible hindrance to vehicles, which will then not avoid the patched places.

4. When many ruts occur in a short distance, the deepest only are to be filled at first. After the patching in these has become solid, then the rest are to be attended to. Long ruts or wheel tracks are not to be filled up the whole length at once, but only short pieces at a time. If this precaution is neglected, vehicles avoid such places, and new ruts are formed elsewhere.

5. Inasmuch as more material is worn off in a dry season than can be put on, there are then, when wet weather comes, large places to be repaired. These must be mended by degrees, never filling up a piece larger than 8 to 10 feet by 4 to 7 feet at a time, and not having these pieces too near together; when these have become solid then some more may be filled in, and so on till the whole is done.

Should it, however, become absolutely necessary to repair a piece of road in dry weather, the place where the new macadam is to be deposited must be loosened up with a pick then the new material is to be put on and a solid top formed by the judicious use of stone-dust or other binding material and sprinkling with water and pounding down with the shovel, or by what may be called "puddling" until the whole be solid. Should a frost or very dry weather occur immediately after the macadam has been put on the road in wet weather, so that the same will not join to the rest of the road-surface, the whole must be removed, cleaned and returned to the storage heaps for future use.

A layer of macadam over the whole road should never be put on, without treating it immediately afterwards in the manner described above for building new roads, that is, mixing in binding material with the top course and rolling it in wet weather or after sprinkling.

The road-keeper is naturally also the person to see to the proper delivery on the part of the contractors, if such there be, of the road material in the prescribed places, and to attend to the measuring of the same.

In short, and to sum up, it is his business to keep the road in good order, and with proper men and surveillance the desired result is achieved easily, and at a less cost than by any other system. The quantity of macadam required to keep a certain length of road in repair varies very much; it depends, as we have seen, on the care with which the repairs are made, naturally also on the kind of stone used and on the amount of travel over the road.

Before, as well as since the introduction of railways, engineers in England, Germany and France made many experiments on the force necessary to pull different vehicles, at various speeds over various surfaces. To enumerate the details of all these experiments would be perhaps uses; a few general results only are here given.

Experiments, as above indicated, were made by Edgeworth, Count Rumford, Bevan, Macneill, Minard, Navier, Perdonnet, Pencelet, Flachat, Morin, Kossak, Umpfenbach, Gerstner, and no doubt others, a list of authorities that proves the subject to have been well nigh ex-

hausted. The experiments of Morin, made in 1838-41, appear to have been made with a degree of care and accuracy, leaving nothing more to be desired. Table X is an extract from his results, and gives that fraction of the weight of the vehicle and load which is required to move them on a level road:

CHARACTER OF THE ROAD.	CHARACTER OF THE VEHICLE.					
	2-wheeled carts.	Trucks, 4-wh., 3 and 4 horse.	4-horse stage coaches, on springs.		2-horse carriages, body on springs.	
Firm soil, covered with gravel 4 to 6 inches deep	$\frac{1}{12}$	$\frac{1}{9}$	$\frac{1}{8}$		$\frac{1}{6}$	
Firm embankment, covered with gravel 1½ to 1½ inches deep	$\frac{1}{10}$	$\frac{1}{11}$	$\frac{1}{10}$		$\frac{1}{10}$	
Earth embankment, in very good condition	$\frac{1}{11}$	$\frac{2}{9}$	$\frac{2}{8}$		$\frac{2}{8}$	
Bridge flooring of thick oak plank	$\frac{1}{10}$	$\frac{1}{8}$	$\frac{1}{14}$		$\frac{1}{12}$	
BROKEN STONE ROAD.						
In very good condition, very dry, compact and even	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{11}$	$\frac{1}{9}$	$\frac{1}{12}$
A little moist or a little dusty	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{2}{7}$	$\frac{1}{4}$	$\frac{2}{7}$
Firm, but with ruts and mud	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{9}$
Very bad, ruts 4 to 4½ inches deep, thick mud	$\frac{1}{9}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{10}$
Good Pavement						
{ Dry	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{9}$
	$\frac{1}{9}$	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{5}$	$\frac{1}{4}$

To take an example, suppose we have a truck weighing with its load 9,000 pounds. How many pounds traction will be required to move the same?

Ans.—On firm soil, gravel 4 to 6 inches deep, that is, a newly repaired road, as we often find it ($\frac{1}{12}$ by table), 1,000 pounds; on best kind of embankment ($\frac{1}{10}$ by table), 310.3 pounds; on broken stone road in good condition ($\frac{1}{11}$ by table), 166.6 pounds; on broken stone road, deep ruts and mud ($\frac{1}{11}$ by table), 643 pounds; on a good pavement ($\frac{1}{10}$ by table), 138.5 pounds. Or since the tractive force of a medium horse when working all day is said to be about 125 pounds, we need in the first case, 8 horses; in the second case, 2½ horses; in the third case about 1½ horses; in the fourth case, about 5 horses; and in the fifth case, only one good horse to move the same entire load all day.

These facts expressed in Table X in striking, yet perhaps dry figures, can be nearly as well given in popular language.

Says a correspondent (Dr. Holland) of the *Springfield Republican*, writing from England, after describing the kind of horses in use there: "Now with all these horses the rule follows that every pound of muscle does just as much work on the road as two pounds do in

America. The cab and omnibus horse does twice as much as the same horse does in America. The draft horse does as much at the dray as two ordinary dray horses in America, and the little horses, which are driven mainly in butchers' carts and grocers' carts, will tire a cab horse to follow them with no load at all.

"In connection with these statements it should be recorded that the speed of all vehicles in the streets of London, whether the localities be crowded or not, is at least a third faster than it is in corresponding streets in American cities. The ordinary speed of vehicles in London, in which passengers or light loads are transported, is one which is considered not entirely safe in Main street, Springfield, Mass., and one which, in some streets of Boston or New York, would be at once checked by the police. A man who sits in a 'Hansom' finds himself driven at an unprecedented pace through crowded thoroughfares, and Yankee though he may be, he will often wonder whether he is going to bring up at last without a broken neck.

"I mention this matter of speed, particularly, because it shows that even more work is done by one horse in London than by two in New York. He not only draws as large a load, but he travels with greater rapidity. The streets of London present such a spectacle of headlong activity as no American city can show, in consequence of the rapid passage of all sorts of vehicles through the streets. I might add to this statement, touching the superior speed of the London horses, a word about the greater weight of the carriages which they are obliged to draw behind them. All carriages are built more heavily in Great Britain than in America. They are built to last, and many of them seem to me to be superfluously heavy.

"The point which I wish to impress upon my American reader is simply this: that the English horse, employed in the streets of a city, or on the roads of the country, does twice as much work as the American horse similarly employed in America. This is the patent, undeniable fact. No man can fail to see it who has his eyes about him. How does he do it? Why does he do it? These are most important questions to an American. Is the English horse better than the American horse? Not at all. Is he overworked? I have seen no evidence that he is. I have seen but one lame horse in London. The simple explanation is that the Englishman has invested in perfect and permanent roads what the American expends in perishable horses that require to be fed. We are using to-day, in the little town of Springfield, just twice as many horses as would be necessary to do its business if the roads all over the town were as good as Main street is from Ferry to Central. We are supporting hundreds of horses to drag loads through holes that ought to be filled, over sand that should be hardened, through mud that ought not to be permitted to exist. We have the misery of bad roads, and are actually or practically called upon to pay a premium for them. It would be demonstrably cheaper to have good roads than poor ones. It is so here. A road well built is easily kept in repair. A mile of good macadamized road is more easily supported than a poor horse."

"There should be a distinction made between first, second, and third class, or between, as they might be called, State, county, and town roads; the first two should not be left to be dealt with as it is the pleasure of each town. A chain cannot be perfect unless every link in it is so; no more can a road. The State must attend to the State and county roads and set a proper example, at least, to be followed by the towns in the case of their roads. We need, then, a higher power than that of the towns."

"In Baden the condition of the roads has been the subject of great care. Within the last forty-five years many millions have been spent upon them and experience has shown this expenditure to be one of those most advantageously spent. As most of the roads are well laid out and as there are plenty of them, there remains now (1863) mainly the keeping in repair of the roads to be attended to and not to build any new ones. Our endeavor now is, to do this at the minimum of cost. Statistics gathered on this subject show good results, and point out to us the means of arriving at still better ones. The present road law was made in 1810. That part of the old law which relates to the maintenance of roads is still in force, but that part requiring labor as a road tax was abolished in 1831, and likewise most of the road police regulations. The appropriation for roads had to be increased 250,000 florins to pay for the abolished road tax labor and to make up 170,000 florins previously received from tolls, which were also abolished in 1831. The system now is as follows: All town roads are taken care of by the towns. The State merely appoints and pays a roadmaster, so called, who superintends fifteen or twenty road keepers and reports on the state of the roads, the reasons for their bad condition, if that be the case, what is needed, etc. The law for second class or county roads was formerly, that when they were of importance to several towns, they had all to help maintain the same. As this gave rise to continual bickering and quarreling, in which the road suffered most, it was changed in 1856. They are now taken care of under the direction of the State and paid for partly by the State and partly by the towns in which they are situated. Most of the road under this head are those which have arisen in importance since the building of railroads, and are generally those that lie perpendicular to the direction of the railroad they are influenced by. The towns not having the means very often to properly improve and repair such, it was found necessary and expedient to give them the aid of the State, and, in order to procure the necessary funds, all roads that run parallel to railroads, and all those that had lost their importance by the construction of railroads, were in 1855 stricken from the list of State roads. These latter, as the name implies, are wholly under the care and kept up at the expense of the State."

AN ACT.

An act to provide for making, repairing and macadamizing public roads and highways in the several townships of the Commonwealth.

Read in place in the Senate by Hon. G. C. Brown, March 20, 1889, and amended on second reading, March 28, 1889.

SECTION 1. *Be it enacted, &c.*, That in every township of this Commonwealth, the qualified voters thereof, shall on the third Tuesday of February, one thousand eight hundred and ninety, elect one person to serve one year, one person to serve two years, and one person to serve three years, who shall be styled township road commissioners, and at each township election thereafter, they shall elect one person to serve three years, and in case of death, resignation or removal from township, or from any other cause, a vacancy shall occur, said vacancy shall be filled

by appointment by the court of the proper county. *Provided*, that in any township which now has three road commissioners elected under law similar to this section, no new election under this section shall be required, except at the time of expiration of term of incumbent.

SECTION 2. The road commissioners of each township shall meet at the place where the auditors of the respective townships meet to perform their official duties on the first Monday of March, one thousand eight hundred and ninety, and yearly thereafter, and after being duly sworn or affirmed, according to law, to discharge their duties with fidelity, a copy of the same to be filed with the township auditors, shall organize by electing one of their number as president, and one as secretary, and shall appoint one person as their treasurer, who shall not be a member thereof, and shall proceed to levy a road tax which shall not exceed ten mills on each dollar of valuation, including one day's work which every male taxable over twenty-one years of age shall personally work out under the direction of the road master, as hereinafter provided, or shall pay its equivalent in cash, provided that every male taxable whose valuation shall not exceed one hundred dollars shall work but one day or pay in cash therefor, this valuation shall be the last adjusted valuation for county purposes, and which shall be furnished to said road commissioners by the commissioners of the proper county. They shall also divide their township into at least as many road districts as there are sub-schools in the township, and appoint a road master for each district, whose duty it shall be to see that the work done on his district or division is in accordance with plans and specifications furnished him by the road commissioners, and to oversee the men employed while at work on the roads, and keep time of each man working under him, and report to the road commissioners as often as they direct. Road commissioners may require the road masters to give bond, with approved security, for the faithful performance of their duties. The road commissioners at the time of their organization, shall, with the approval of the township auditors, fix the wages to be paid for a day's work, and the number of hours constituting a day's work on the roads.

SECTION 3. The road commissioners shall have full control of road masters and employment of laborers and purchase of material and machinery for making and repairing roads. And the road commissioners may, if they think it to be for the best interest of the taxpayers of their township, let by contract the making of new roads, or repairing of roads, or building of township bridges, or macadamizing of roads or any part thereof. And the said road commissioners shall have the authority to join with the road commissioners of one or more township, in the purchase of stone-breakers, rollers and other expensive machinery, used in the making and repairing of roads.

SECTION 4. The treasurer shall be required to give bond, with approved security, to the township auditors in a sum of double the amount of the road tax duplicate. And he shall pay out moneys received by him as road taxes, only on the written order of the road commissioners, setting forth that for which the order is given, signed by the president of the board and attested by the secretary thereof.

SECTION 5. The road commissioners of each township shall make, or cause to be made, a duplicate designating the amount of road tax levied against each taxpayer of the township, and deliver the same to their treasurer, and shall also give him a warrant to collect the same, to be collected as follows namely, all taxpayers who pay their road tax before

June first of each year to the treasurer, an abatement of five per centum shall be made to such taxpayers. On all road taxes paid to the treasurer between June first and October, the first of each year, the taxpayers will be required to pay the full amount of road tax levied against them, and on the first of October in each year, the treasurer shall make out a list of all delinquent taxpayers, with the amount of road tax levied against each, with ten per centum added thereto as a penalty for such delinquency, and deliver the same to the township collector, who shall immediately proceed to collect the same and make payment thereof to the treasurer as soon as received, and the collector shall receive for his services the ten per centum in penalty added. The treasurer shall receive as compensation for his services one per centum of all moneys received and disbursed by him. *Provided*, that any taxable person may, prior to the fifteenth day of April in each year, notify the township road commissioners, or either of them, of his desire to work out his road tax, in which case the road master of his district shall give him notice of the time and place for its performance, and upon such notice, he may perform the labor under the personal direction of the road master, which labor must be satisfactory to the road master, under penalty of discharge and forfeiture of right to work out the tax. The road master shall make return of the amount of labor thus performed to the township road commissioners, who shall credit the said taxable person with the same, and this credit shall be an offset of his road tax.

SECTION 6. The road commissioners are required to set aside at least one-fourth of the road tax levied each year, subject to the proviso in section fifth of this act, to be expended in macadamizing roads in their townships, the road or roads to be macadamized in each township to be designated by the road commissioners, and in the purchase of scrapers, rollers or other road working machinery, such as shall in their judgement be requisite and necessary, the same to be the property of the township.

SECTION 7. That any person elected road commissioner who neglects or refuses to act, shall pay a fine of twenty dollars, to be collected as other debts of like amount, and paid to the township treasurer for the use of the road fund of said township, unless he shall have served at least one term as such commissioner in the four years last passed.

SECTION 8. That any person appointed road master as herein provided, who shall neglect or refuse to perform the duties thereto appertaining, shall pay a fine of ten dollars, to be collected as other debts of like amount, and paid to the township treasurer for the use of the road fund of said township, unless he shall have served three consecutive years as such road master, or shall for good and sufficient reasons be excused by a majority of the board of commissioners of his township at their discretion, such application to be made to the board within seven days of the date of service of appointment, in which case, the board of commissioners shall make other appointment for the said road district without delay.

SECTION 9. The road commissioners shall receive no compensation for their services, but may be allowed for necessary expenses, such as stationery, light and fuel, to be paid out of township road funds.

The road overseers shall each receive the same per diem pay that laborers are allowed for working on the roads.

SECTION 10. The said board of commissioners shall keep minutes of their proceedings and such books as they may find necessary in the performance of their duties, all of which shall be open for the inspection

of any taxpayer at all reasonable times, and which shall all be submitted for the information of the township auditors, when said auditors meet to audit the accounts of the treasurer and other township officers.

SECTION 11. The provisions of this act shall go into effect on the first Monday of March, one thousand eight hundred and ninety.

SECTION 12. That the said road commissioners shall have all the rights and powers necessary to carry into effect the provisions of this act, and be subject to the same penalties relating thereto, as are now provided by the general laws governing supervisors.

SECTION 13. All general laws inconsistent herewith are hereby repealed.

PENNSYLVANIA ROAD COMMISSION.

HOUSE OF REPRESENTATIVES,
March 29, 1889.

Resolved, (if the Senate concur) That the President *pro tem.* of the Senate shall appoint three senators, and the Speaker of the House of Representatives five representatives, who, in conjunction with five competent citizens to be appointed by the Governor, be constituted a commission to revise and consolidate the laws relating to the construction and improvement of roads and public highways in this Commonwealth, and also to consider the advisability and practicability of the State assisting in the construction and improvement of the same. Said commission to report the result of their labors, by bill or otherwise, to the Legislature at its next regular session. The said commission shall sit during the recess at such times and places as it may select within the State. A sum necessary for its clerical, transportation and other expenses shall be provided in the general appropriation bill and paid upon warrant of the chairman, drawn upon the State Treasurer, and to be audited by the Auditor General in the usual manner.

JOHN W. MORRISON,
Chief Clerk of the House of Representatives.

The foregoing resolutions concurred in.

RUSSELL ERRETT,
Chief Clerk of the Senate.

Approved the 25th day of April A. D. 1889.

JAMES A. BEAVER.

Under the authority of the above resolution, the following commission has been appointed.

Appointed by the Senate.

Hon. A. D. Harlan, Coatesville, Pa.
Hon. A. H. Mylin, Lancaster, Pa.
Hon. A. D. Sloan, Indiana, Pa.

Appointed by the House of Representatives.

Hon. J. G. Foight, Harrison City, Pa.
Hon. W. McCullough, Tarentum, Pa.
Hon. J. E. Faulkner, Waverly, N. Y.
Hon. J. T. Griffith, Kane, Pa.
Hon. J. L. Shillito, Wellsville, Pa.

Appointed by the Governor.

David McCargo, Esq., Pittsburgh, Pa.
Cyrus Gordon, Esq., Clearfield, Pa.
S. R. Downing, Esq., West Chester, Pa.
Jacob Bolard, Esq., Conneautville, Pa.
H. S. Goodwin, Esq., South Bethlehem, Pa.

Officers of the Commission.

Hon. A. D. Harlan, Coatesville, Pa., President.
Chas. F. Ettla, Secretary No. 1305 Locust St., Philadelphia, Pa.

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